The Builder.

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Railways and Bridges at the Paris Exhibition.

ONE effect of the Paris Exhibition has undoubtedly been to stimulate the construction of works having for their object the multiplication of means of rapid transport and the improvement of communications generally. Some of the undertakings which we now propose to mention are of a temporary character, being intended solely for the convenience of visitors to the Exhibition, but others will remain as permanent additions to the public services of the French capital.

The efforts made by the Compagnie des Chemins de Fer de l'Ouest are worthy of special commendation. Considerable works have been undertaken by this company for the extension of its system and for the establishment of connexions between its various lines in Paris. As our readers are probably aware, a junction has existed for some time near Grenelle station, linking the Ceinture railway and the Moulineaux line. Communication between Saint Lazare and the Champ de Mars was thus possible, although not particularly convenient; but the directors of the Western Railway Company decided upon the construction of a new line, leaving the existing track at Courcelles, doubling the Ceinture line as far as the Trocadéro station, then branching to the left hand towards the river, and finally reaching the Gare du Champ de Mars. No appreciable change is caused in the appearance of the boulevards by the additional metals. From the Courcelles station to that of Neuilly the necessary space is provided to the right and left of the old permament way. Vertical retaining walls have now been constructed on either side along the boulevard Pereire, and other roads crossing the railway are carried on metallic platforms supported by columns. A short distance beyond the Trocadéro station the down track passes beneath the Auteuil line to join the up track. These two sets of metals, after having run in separate tunnels for a distance of about 220 mètres, enter together a double tunnel 340 mètres long, which ends in the station of Boulainvilliers, established in an open cutting. Beyond this point the railway follows an underground course for about 275 mètres, emerging into the open air near the Quai de Passy, and passes over two consecutive bridges crossing the river about the middle of the Ile des Cygnes. The larger or navigable channel is traversed at an angle of 60 deg., and the smaller arm at an angle of 45 deg.

With regard to the more important of the two bridges it may be remarked that an essential condition for observance was that navigation of the Seine should not be impeded by the presence of piers. After considering several types of bridge suitable for spanning a distance of from 80 mètres to 100 mètres, the engineer decided upon the construction of a viaduct similar to that adopted at Grunenthal, on the Kiel Canal. Between massive abutments of masonry two latticed arches with vertical and diagonal bracing spring from one side of the river to the other, the starting point at each abutment being considerably below the level of the roadway. These arcs and the roadway intersect a short distance from the abutments, and between the points of intersection the roadway is suspended by rods of 10 cm. diameter and spaced about 4 mètres apart.

The bridge over the smaller arm of the river includes three metal arches springing from masonry piers, and supporting the lower girders which are connected by steel ties with those carrying the roadway. In the upper masonry of the pier are refuges for railway employees, and about halfway up each pier is a bull's-eye, in which a signal light is placed for the guidance of navigators. These lights are so situated that they do not interfere with signals used on the railway above. On the left bank of the river the new line joins that from Moulineaux, and the four lines of metal continue to the Gare du Champ de Mars, but the main line branches to the left after traversing the Boulevard de Grenelle, and runs on to the new terminus at the Esplanade des Invalides. On the river bank the railway is in an open cutting, but this is temporarily covered for such part of its length as passes through the Exhibition. The walls of the cutting are not more than 4 in. thick, and are composed of a steel framework covered by wood and cement. The platform covering the line is formed of concrete, strengthened by iron bars and bands. This temporary tunnel is lighted by openings at the sides and top. As some of the Exhibition buildings are immediately above this fragile work, independent provision was, of course, necessary for their support. In addition to the terminus there are two stations on the new line within the Exhibition grounds—one at the Avenue de la Bourdonnais and the other at the Place de l'Alma.

The Gare des Invalides occupies the space between the Rue de Constantine and the Rue Fabert. The lines and platforms are entirely below ground level, and cover a trapezium of 220 mètres in length by 120 mètres average width, whilst the superficial area of the station is about 25,000 square mètres. There are seven platforms, about 170 mètres long, and fifteen lines of rail, converging into two at the commencement of the tunnel. A considerable area of the underground station is covered by a roof carried on cast-iron columns, supported on metal foundations. The roof framework is built of steel girders and ties, into which lozenge-shaped panes of glass are inserted. Steel pivots and cushions are arranged beneath the girders so as to permit of expansion and contraction, and the ends of the girders, occurring at alternate columns, are about 1½ in. apart. Considerable care was necessary during the construction of the station owing to the proximity of a large siphon carrying sewage beneath the river. As a matter of fact, we believe this conduit was damaged in the early building operations, but the precautions then taken prevented the occurrence of any subsequent mishap. That part of the station-covering which is beneath the esplanade is some-

what higher than the original level as, owing to constructional details connected with the Alexandre III. bridge, it was found necessary to raise the quay level by nearly 2 mètres. In the gardens covering this part of the station the openings necessary for ventilation are hidden from view. The superstructure has a façade of 95 mètres in length, and is 23 mètres deep. A spacious booking hall, at the level of the street, extends the whole width of the platforms, and there are six staircases arranged alternately with booking offices. An excellent characteristic of this station is the provision of separate departments for dealing with luggage, parcels, &c., so that passengers may not be subjected to the inconvenience and danger present in most of our large stations in London.

Electric traction has been adopted on the line between the Champs de Mars and the Invalides, and the company proposes further to inaugurate an important extension of the system before long. With this object in view a large generating station is being equipped at Billancourt. This establishment will ultimately contain nine generators, although only six are included in present arrangements. The generators are 800 K.W. tri-phase 5,000-volt revolving field alternators; the field is 14 ft. diameter and has thirty-eight poles. The engines, made by Dujardin et Cie, of Lille, are of the triple-expansion four-cylinder type, and indicate 1,500 h.-p. with steam at 150 lbs. pressure. Westinghouse engines have been adopted for driving the exciters, each unit being intended to furnish current for three generators at 125 volts. These engines run at about 290 revolutions per minute, under steam at 150 lbs. pressure. Ten boilers by Meunier, of Lille, are installed in the adjoining boiler-house. During the continuance of the Exhibition this station furnishes power for the *plate-forme mobile* and the circular electric railway, in addition to the new line of the Western system, but ultimately it is to constitute the main power-station of the Compagnie de l'Ouest.

Other extensions of the Western Railway system will prove of the greatest value. For instance, trains leaving the Invalides will not only be able to reach other parts of Paris and the suburbs, but services will also be established giving direct communication with all the lines of Brittany and Normandy. The company will be in possession of a new terminus in an extremely convenient and central position, and, on the conclusion of the Exhibition, the greater part of Gare du Champ de Mars will become available for use as a goods station.

Although only about half the size of the station at the Invalides, the new terminus of the Orléans line, near the Pont de Solférino, on the Quai d'Orsay, will constitute a great improvement, and traffic will be considerably facilitated by the fact that the two stations are not more than 700 mètres apart. On the extension of the Orléans line electric traction will also be introduced.

We have previously described the general course and conditions of the Paris Metropolitan Railway, but a few particulars as to the working may be of interest. For working its first system the company has provided 161 carriages, nearly two-thirds second-class, one-third first-class, and the remainder of composite character. Electric traction is, of course, employed, and the current is conveyed by a third rail to motors of 100 h.-p. attached beneath certain of the cars, and not forming part of a separate locomotive as in the South London and Central London Railways. The vehicles are not particularly roomy and are a long way behind the spacious cars to which we are now becoming accustomed in this country. Moreover, the design adopted is by no means calculated to facilitate the clearance of trains at the various stations. When all the rolling stock has been furnished the management propose to establish a two-minute service in the busiest times of the day, and at other periods the service will be regulated according to requirements. It was estimated that the total cost of the present installation would not exceed twenty-two millions of francs, including administrative buildings, workshops, generating depôt, and the sub-station at the Place de l'Etoile. Considering recent advances in the price of materials and wages, especially in Paris, the sum mentioned appears to be very reasonable, but we believe it has been somewhat exceeded. Although the opening of the line was known to comparatively few people, no fewer than 30,000 tickets were sold on the first day between the hours of 1 p.m. and 8 p.m. The Metropolitan system will ultimately be extended to other parts of the city, and the complete scheme includes the construction of 48½ miles of double track, the total cost being estimated at 232,000,000 fr.

If the *plate-forme mobile* at the Exhibition were seen and not heard it would be an even more popular institution than it is at present. This contrivance, which serves in some measure to link together the scattered portions of the Exhibition, is 3,370 mètres in length, and the period of time occupied in one circuit is abour half-an-hour. One portion of the platform, 2 mètres wide, has a speed of 8·5 kilomètres an hour, and the other, with a width of ·85 mètre, moves at the rate of 4·25 kilomètres an hour. The height of the moving way above ground level is about 7 mètres, but variations occur at different parts of the route. As a general rule, the gradients do not exceed 3 to 4 per cent. Timber scaffolding on concrete foundations serves to support the platform and its auxiliary appliances. Above the timber standards are two longitudinal box girders built of angle bars and plates, and on these are laid transverse timbers supporting timbers which in turn carry rails for the small flanged wheels at each side of the platform. Each platform may be said to constitute a series of trucks, the front end of each being rounded so as to fit a complementary curve in the back end of the adjoining truck. By means of suitable castors running on iron guides fixed underneath the deck, swivelling joints are formed so that corners may be turned without difficulty; and there are also hinged joints permitting a certain degree of vertical deviation when gradients are encountered. The platforms are fitted with rails running on wheels, some of which are idle whilst others are driven by small dynamos. All these wheels are carried by iron brackets of which one end is supported by a rod bolted to the timber framing and the other by a transverse steel spring hanging from vertical rods. By this arrangement the motor wheels are relieved of unnecessary weight; a certain degree of resiliency is imparted to the platform, and the propulsion is entirely of a frictional and rolling character. The electrical equipment consists of 172 double-reduction 5 h.-p. motors made by the French Westinghouse Company. These motors are carried in the manner described above and power is transmitted by suitable gear to the driving wheels. Shafts with universal joints are provided so that oscillation of the platform shall not interfere with the efficiency of the driving apparatus. Either platform may be driven separately if so desired. The motors are of series type, and a current of 500 volts is transmitted by cables of 100 mm. cross section; copper feeder-bars of large section are run on insulators carried on the framework, where they are easy of access but cannot be reached by passengers. Smaller leads are used for lighting purposes. At full speed the motors run at 275 revolutions and the driving wheels at seventy-three revolutions per minute. The lower casings of the motor are perforated to ensure ventilation, whilst the upper casings are contrived so as to protect the apparatus from the weather. It is stated that the average consumption of energy is 300 K.W. per hour, with a speed of 5 kilomètres per hour and a load of about 25,000 passengers. The viaduct of the platform has absorbed timber representing a cube of 1,500 mètres; more than 1,500 tonnes (1,476·3 tons avoirdupois) of steel have been used, and the electric cables weigh altogether 50,000 kilogrammes. The *plate-forme* was constructed by the Compagnie des Transports Electriques, under the superintendence of M. Maréchal, ingénieur des Ponts et Chaussées.

The *chemin de fer électrique* circulates round a course almost identical with that pursued by the *plate-forme mobile* although the cars run in the opposite direction. This line, having a gauge of 1 mètre, is laid as far as possible on the ground level, but on part of the track viaducts are required, and at the Pont de l'Alma and at Porte Rapp cuttings are employed. As a precautionary measure the power rail is situated on the side of the line furthest removed from the passenger platforms, and it is of the same weight (25 kilogrammes per mètre) as those used for the running track. Electrical connexion between the rails is made by copper bonds rivetted in position, and as the running lines are used for the return current they are similarly bonded. The rolling stock consists of ten cars fitted with motors and eighteen ordinary cars; each train consists of three cars, one of the former and two of the latter class, with a total capacity of about 200 passengers. The number of trains varies according to circumstances, but if required the company can maintain a one and a-half minute service and a speed of ten to eleven miles an hour, including stoppages. Four Westinghouse 500 volt motors of 30 h.-p. are fitted to each motor car, which is also complete with air and hand brakes. The railway was constructed by the Compagnie des Transports Electriques.

Prominent amongst the permanent aids to locomotion is the Pont Alexandre III., the architectural features of which we have considered in a previous article. In the execution of this important work some little trouble was occasioned by the stipulation that a clear passage of 50 mètres should be left open for navigation of the river during construction. Consequently a temporary

bridge serving as a working platform was erected over the site of the new bridge. This temporary structure, weighing some 300 tons, was made in two sections, being put together on platforms supported by piles. The two portions, each about 90 mètres in length, were drawn to the desired positions by steel cables, and then bolted together. Hoisting gear was provided for the purpose of assisting in the work of fixing the heavy steel girders and other members of the permanent bridge. Another condition imposed (as already noted) was that the roadway of the bridge should be level with adjoining thoroughfares, and that no obstruction should be offered to the view of buildings at either side of the river. The engineers, MM. Résal and Alby, have admirably complied with all essential requirements, and in this work the principle of the three-hinged arch is successfully exemplified. Having a total length of 180 mètres, the bridge crosses the river in a single span of 107·50 mètres; the roadway is 60 mètres wide and 8 mètres above the normal water-level of the river. If a steel arch were rigidly connected to the abutments considerable strain would be evidenced both in the centre and at the ends as the metal expanded under the influence of temperature. The general practice is, therefore, to hinge or pivot the ends to the abutments and a bridge so constructed exemplifies what is termed the two-hinged arch, in which the ends are relieved from unnecessary strain, but the centre, where bending moment attains its maximum has no such relief. This disadvantage is here removed by the application of a third pivot at the centre, constituting the three-hinged arch, a system of construction proposed in the year 1861 by M. Mantion.

As the Alexandre III. bridge includes some 7,000 tons of steel it is evident that some care was necessary in connexion with the building of the abutments. These are formed of granite blocks from the Vosges, cemented together, and the pressure exerted upon them is estimated at 50 kilogrammes per square centimètre. In order to secure a firm foundation the constructors were obliged to excavate to the depth of 18·75 mètres on the right bank and 19·50 on the left. Caissons of sheet iron were employed for the purpose and they were afterwards filled with concrete and granite. Securely bedded in the abutments at either end is a series of fifteen massive steel castings, and on the projecting part of each there is a horizontal groove of semicircular section, designed to receive half of the pin upon which the arch is pivotted. The other half of the pin fits into a corresponding groove in one of the main girder ends, which are spaced 3·60 mètres apart. These girders are built of separate steel castings, sometimes designated in traditional and inappropriate phraseology as "wedge-stones." A sample casting may be seen just outside the Creusot dome on the Quai D'Orsay. Each outer girder weighs 167 tons, and the others 144 tons; in some cases the castings were bolted together on movable platforms supported on piles, and the connected section was then pushed into place by jacks, but towards the middle of the river the castings were lowered separately from the working bridge and bolted in position. Where the longitudinal girders meet at the centre of the bridge there is another series of pivots somewhat similar to those at the abutments. The platform carrying the roadway is supported by vertical members connected to the longitudinal girders, and all are diagonally braced except the last rows, which are stayed at the top by portal-like arches. The platform is extended over the quay at each end, being carried there by masonry arches. A novel arrangement has been adopted in connexion with the footpath curbs, which are separated from the paths by spiral springs placed at short intervals apart, and are intended to provide an elastic cushion for protection of the curb, and perhaps also of vehicles. Those who are interested in constructive works of the kind will find it easy to examine the hinging of the bridge from the lower quay level at each side of the river, and the central pivots can be inspected by taking a trip in one of the steamboats plying in this section of the river. The amount of play permitted by the castings around the pivotting pins may seem at first sight to be very small, but it should be remembered that very little movement is to be expected at the abutments. At the time of our last visit the upper faces of the castings enclosing the pins were not more than ½ in. apart, and the gap across the roadway and footpaths above was probably less than 1¼ in. wide between the sliding plate and the asphalt. MM. Schneider et Cie, of Creusot, were the contractors for the erection of the bridge.

Connecting the Quai de Billy with the Palais des Armées de Terre et de Mer on the opposite bank is a new footbridge or "Passerelle," in which the pathway is suspended from a large central arch, springing from masonry piers a little distance from each side of the river. Support is also furnished by arcs springing from the piers to the buildings at each end. The voussoirs are box girders up to the points of intersection with the footpath, above which the upper and lower plates are connected by diagonal and vertical bracing. Halfway along the end arcs gussets are bolted to the upper plates, and from these long ties extend to the centre of the main arch. The footway is carried on sections built of angle bars, braced with vertical and transverse ties, and similar members connect the two sides of the arches. Columns are used for supporting the ends of the bridge, which continue up to, but do not abut on, the buildings.

The Pont d'Iéna, as already noticed, has been entirely disguised. The stone balustrades are removed, and the footpaths on each side are widened to the extent of about 3 mètres by the addition of transverse plate girders 5 mètres long. These are carried at their outer ends by longitudinal members, supported by cantilevers secured to the masonry piers of the structure. Vertical wings are provided to which uprights are bolted for fixing steel balustrades.

Two other temporary footbridges have been built, one of three spans close to the Pont de l'Alma, and the other of four spans adjoining the Pont des Invalides. Both these bridges are of similar type, being supported by piers of piles driven into the river bed and connected by cross timbers. Longitudinal girders are attached to each pier frame and joined by transverse girders. These footbridges possess no particularly interesting features beyond their usefulness to visitors.

In addition to encroaching upon the river front the Exhibition authorities have boldly annexed portions of the public thoroughfares in some places, the most important of which are the Quai de Billy and the Cours la Reine. To provide for traffic along the former of these the way has been altered so as to pass beneath a bridge in front of the Pont d'Iéna, and along which the Versailles steam tramway service continues. Over this road several timber footbridges of rudimentary construction afford access from one part to another of the Exhibition, and the level bridge above mentioned is an erection of armed cement, which it would certainly be unwise to use for anything heavier than pedestrian traffic. To replace the tramway lines removed from the Cours la Reine a new road has been made at a lower level along the Quai de la Conférence, commencing at the Pont des Invalides, and rejoining the original route beyond the Entrée Monumentale. This road passes beneath the Alexandre III. bridge, and we presume is intended to become a permanent institution. A fairly large number of small footbridges have been built over various thoroughfares intersecting the Exhibition. Nearly all these erections are of timber, perhaps because all the available engineering firms were fully occupied by more important work. Speaking generally, these bridges appear to be of substantial though clumsy proportions—in an engineering sense that is, though they are mostly of picturesque appearance.

AN IMPORTANT POINT AS TO RIGHT OF LIGHT.

THE practical difficulties which arise from the absence of a code of English law are usually most marked in plain applications of legal principles to every-day life. This absence causes, from time to time, complications and judicial contradictions which would not exist were the main principles of law on the leading branches of English jurisprudence defined in a code. The present state o affairs is all very well for lawyers, but over and over again it is a cause of inconvenience and expense to laymen. A very glaring instance of this is shown by an interesting and important judgment of Mr. Justice Wright, recently delivered in the case of Warren *v.* Brown.

At the present time the law of light is engaging more than usual professional attention, and, therefore, it appears desirable to comment on the curious conflict of judicial decision which is evident in a particular branch of the law of light. It is well known that the owner of the dominant tenement is entitled as a general principle to such an amount of light as is sufficient for all ordinary purposes—that is to say, he is not to have his dwelling-house made substantially less comfortable or his place of business substantially less useful. This implies that if some work is being carried on in a building which does not require a special amount of light, yet that the owner of it is not on that account to be deprived of a reasonable and substantial amount if he has a prescriptive right to it. It implies also that the owner of a dominant tenement is not entitled to what may be called an extraordinary amount if enough is left by the owner of the servient tenement for all the ordinary purposes of light. But this does

not settle the question whether the owner of a dominant tenement is entitled to an extraordinary amount for an extraordinary purpose. It is on this point—one becoming more and more important—that judicial decisions are opposed.

In 1867 Vice-Chancellor Malins, in Lanfranchi *v.* Mackenzie, decided that the owner of a dominant tenement who required an extraordinary amount of light for a special purpose—sampling silk—was not entitled to it because he had not used it for the full period of twenty years. He suggested, however, that if it had been used for twenty years he might be entitled to it. Coming to the year 1897 we find Mr. Justice Kekewich deciding exactly the contrary, and giving judgment in Lazarus *v.* The Artistic Photographic Company in favour of a photographer who required an extraordinary amount of light for a special purpose. "It seems to me to be incorrect to say," he said, "that the plaintiff cannot claim light for the extraordinary purpose of photography because he has not photographed in those premises for the whole period of twenty years." In the case of Wharton *v.* Brown, decided by Mr. Justice Wright shortly before the rising of the Court for the Long Vacation, the Judge came to a directly opposite conclusion. "The plaintiff has during some years, not much less than twenty years, carried on in the premises a manufacture of hosiery by means of machinery which requires a very exceptional quantity and quality of light for the continued and accurate adjustment of filament to fine needles, moving at speed in bundles of some hundreds." The Judge found also that this extraordinary amount of light had been diminished by the defendant, but that there was a substantial amount left. There was "an abundance of light left for all ordinary purposes of inhabitancy or business," and therefore that the plaintiff was not entitled to proceed. Here, therefore, we have a clear and direct conflict of modern judicial decisions on a practical and important point of law which must be coming up almost daily. It is strange that the question has not been settled before, but such is the present state of affairs. To discuss elaborately the legal bases of these decisions would be suitable in a legal publication; here it is desirable to regard practical reasons. We agree entirely with this judgment of Mr. Justice Wright. "Unless," he said, at the conclusion of it, "there is some limitation of the right to light for ancient windows, it is difficult to see how the ordinary extensions and improvements of towns could be carried on. If every house which has existed for twenty years is entitled to have all, or substantially all, the same light come to its windows as during the twenty years, no new houses could be built opposite to old ones unless at a distance which would impose on servient tenements an unreasonable burden, and might involve grave public inconveniences." As a matter of fact, this is exactly what does occur, and new houses are built after what at recent meetings of the Institute of Architects and of the Surveyors' Institution was called "the payment of blackmail." Common sense is obviously in favour of Mr. Justice Wright's decision. For if Mr. Justice Kekewich is right a photographer might prevent to-day the erection of an important and well-planned building because it interferes with his special light: in its place might be one dwarfed and unsymmetrical. Yet a year hence he might remove to another place, the house might be occupied for other purposes, for which, had the house on the servient tenement been erected as planned, there would have been a substantial amount of light left. Even supposing the photographer, if the building on the servient tenement were allowed to be erected, was prevented from carrying on his work, still he can move. Men in business and ordinary tenants of houses are obliged to move from time to time by causes which inconvenience them. Why, we may fairly ask, is a person in a special trade to have this special protection? Really it is the *reductio ad absurdum* of the right of a dominant tenement to light over a servient tenement. It is high time that the point was settled by the Court of Appeal, and that if the decision of this tribunal proves adverse to the ends of modern communities, that the subject should be put into a proper legal state by legislation. But to have important rights such as these depend not on a fixed principle of law but upon chance, upon whether the case is brought before Mr. Justice A or Mr. Justice B, is a positive legal scandal. For there cannot be a doubt that Mr. Justice Kekewich would have given a different decision to Mr. Justice Wright had the case which came before the latter have been tried by him, and that Mr. Justice Wright would not allow photographers to prevent the erection of buildings which, though they may diminish the light, yet leave a reasonable and substantial amount.

NOTES.

Awards to British Architects, Paris Exhibition.

The following is the official list of awards to British architects in the Fine Arts Section of the Paris Exhibition:—Gold Medals: J. Belcher, A.R.A., T. E. Collcutt, W. Emerson, P.R.I.B.A., E. L. Lutyens, Aston Webb, A.R.A. (Rappel). Silver Medals: Austin & Paley, J. J. Burnett, A.R.S.A. (Rappel), W. D. Caröe, C. Clowes, H. Field, W. Leiper, R.S.A., E. J. May, E. W. Mountford, L. Stokes. Bronze Medals: B. Champneys, Lanchester, Stewart, & Rickards, A. Mitchell, A. B. Pite. The following are among the awards to sculptors:—Medals of Honour: T. Brock, R.A., G. Frampton, A.R.A., H. Thornycroft, R.A. Gold Medals: C. J. Allen, A. Drury, A.R.A., W. Goscombe John, A.R.A., A. C. Lucchesi, J. M. Swan, A.R.A. Silver Medals: F. Bowcher, W. R. Cotton, H. C. Fehr, F. L. Jenkins, E. R. Mullins (Rappel), H. A. Pegram, F. W. Pomeroy. Bronze Medals: A. Toft. Honourable Mention: G. Bayes, D. B. McGill, P. Macgillivray, A.R.S.A.

Charing Cross Station.

It is one thing to obtain Parliamentary powers to undertake work; it is quite another to execute it. From the address of the Chairman at the recent meeting of the South-Eastern Railway Company it appears that for the present this company has given up its intention of enlarging Charing Cross station. This decision is placed to the account of bad times. Parenthetically the Chairman stated that the same decision had been arrived at in the case of Ashford and Tonbridge stations, though he was careful to state that these works were really necessary. It may be doubted whether, even when times are bad, it is sound policy to abstain from executing works which are admittedly necessary for the purpose of public convenience and even safety. Such works may not at first sight seem as paying as new extensions which tap fresh sources of traffic, but on the other hand they help to accommodate larger numbers of passengers, to attract others; they make a line more convenient and enable more trains to be run. There is another thing to be said—passengers keep increasing in number, and if railways do not undertake works which are admittedly necessary, they do not appear to be carrying out the compact with the community which they have undertaken.

Whitgift's Hospital, Croydon.

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not settle the question whether the owner of a dominant tenement is entitled to an extraordinary amount for an extraordinary purpose. It is on this point—one becoming more and more important—that judicial decisions are opposed.

In 1867 Vice-Chancellor Malins, in Lanfranchi *v.* Mackenzie, decided that the owner of a dominant tenement who required an extraordinary amount of light for a special purpose—sampling silk—was not entitled to it because he had not used it for the full period of twenty years. He suggested, however, that if it had been used for twenty years he might be entitled to it. Coming to the year 1897 we find Mr. Justice Kekewich deciding exactly the contrary, and giving judgment in Lazarus *v.* The Artistic Photographic Company in favour of a photographer who required an extraordinary amount of light for a special purpose. "It seems to me to be incorrect to say," he said, "that the plaintiff cannot claim light for the extraordinary purpose of photography because he has not photographed in those premises for the whole period of twenty years." In the case of Wharton *v.* Brown, decided by Mr. Justice Wright shortly before the rising of the Court for the Long Vacation, the Judge came to a directly opposite conclusion. "The plaintiff has during some years, not much less than twenty years, carried on in the premises a manufacture of hosiery by means of machinery which requires a very exceptional quantity and quality of light for the continued and accurate adjustment of filament to fine needles, moving at speed in bundles of some hundreds." The Judge found also that this extraordinary amount of light had been diminished by the defendant, but that there was a substantial amount left. There was "an abundance of light left for all ordinary purposes of inhabitancy or business," and therefore that the plaintiff was not entitled to proceed. Here, therefore, we have a clear and direct conflict of modern judicial decisions on a practical and important point of law which must be coming up almost daily. It is strange that the question has not been settled before, but such is the present state of affairs. To discuss elaborately the legal bases of these decisions would be suitable in a legal publication; here it is desirable to regard practical reasons. We agree entirely with this judgment of Mr. Justice Wright. "Unless," he said, at the conclusion of it, "there is some limitation of the right to light for ancient windows, it is difficult to see how the ordinary extensions and improvements of towns could be carried on. If every house which has existed for twenty years is entitled to have all, or substantially all, the same light come to its windows as during the twenty years, no new houses could be built opposite to old ones unless at a distance which would impose on servient tenements an unreasonable burden, and might involve grave public inconveniences." As a matter of fact, this is exactly what does occur, and new houses are built after what at recent meetings of the Institute of Architects and of the Surveyors' Institution was called "the payment of blackmail." Common sense is obviously in favour of Mr. Justice Wright's decision. For if Mr. Justice Kekewich is right a photographer might prevent to-day the erection of an important and well-planned building because it interferes with his special light: in its place might be one dwarfed and unsymmetrical. Yet a year hence he might remove to another place, the house might be occupied for other purposes, for which, had the house on the servient tenement been erected as planned, there would have been a substantial amount of light left. Even supposing the photographer, if the building on the servient tenement were allowed to be erected, was prevented from carrying on his work, still he can move. Men in business and ordinary tenants of houses are obliged to move from time to time by causes which inconvenience them. Why, we may fairly ask, is a person in a special trade to have this special protection? Really it is the *reductio ad absurdum* of the right of a dominant tenement to light over a servient tenement. It is high time that the point was settled by the Court of Appeal, and that if the decision of this tribunal proves adverse to the ends of modern communities, that the subject should be put into a proper legal state by legislation. But to have important rights such as these depend not on a fixed principle of law but upon chance, upon whether the case is brought before Mr. Justice A or Mr. Justice B, is a positive legal scandal. For there cannot be a doubt that Mr. Justice Kekewich would have given a different decision to Mr. Justice Wright had the case which came before the latter have been tried by him, and that Mr. Justice Wright would not allow photographers to prevent the erection of buildings which, though they may diminish the light, yet leave a reasonable and substantial amount.

NOTES.

Awards to British Architects, Paris Exhibition.

The following is the official list of awards to British architects in the Fine Arts Section of the Paris Exhibition:—Gold Medals: J. Belcher, A.R.A., T. E. Collcutt, W. Emerson, P.R.I.B.A., E. L. Lutyens, Aston Webb, A.R.A. (Rappel). Silver Medals: Austin & Paley, J. J. Burnett, A.R.S.A. (Rappel), W. D. Caröe, C. Clowes, H. Field, W. Leiper, R.S.A., E. J. May, E. W. Mountford, L. Stokes. Bronze Medals: B. Champneys, Lanchester, Stewart, & Rickards, A. Mitchell, A. B. Pite. The following are among the awards to sculptors:—Medals of Honour: T. Brock, R.A., G. Frampton, A.R.A., H. Thornycroft, R.A. Gold Medals: C. J. Allen, A. Drury, A.R.A., W. Goscombe John, A.R.A., A. C. Lucchesi, J. M. Swan, A.R.A. Silver Medals: F. Bowcher, W. R. Cotton, H. C. Fehr, F. L. Jenkins, E. R. Mullins (Rappel), H. A. Pegram, F. W. Pomeroy. Bronze Medals: A. Toft. Honourable Mention: G. Bayes, D. B. McGill, P. Macgillivray, A.R.S.A.

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The Architectural Association Lectures.

The opening meeting of session 1900-1901 of the Architectural Association will be held on Friday, October 5, when the President, Mr. W. H. Seth-Smith, will deliver an address and distribute the prizes. On October 19 the annual conversazione will be given. The lectures to be delivered at the succeeding ordinary general meetings are likely to be specially interesting, as will be seen from the following list:—"French and English Cathedrals," by Mr. Francis Bond, M.A.; "The Legal Position of the Architect," by Mr. L. L. Macassey; "The Use of Rolled Joists in Construction," by Mr. A. T. Walmisley; "Colour in Architecture Seen through an Artist's Glasses," by Mr. A. Wallace Rimington; "Hints on the Preparation of Studentship Drawings," by Messrs. Beresford Pite and R. N. Schultz; "Flats," by Mr. Edwin T. Hall; "Cretan Architecture," by Mr. D. T. Fyfe; "Gothic Architecture and the Basis of its Beauty," by Mr. E. S. Prior; "The Paris Exhibition," by Mr. E. W. M. Wonnacott; "Rowton Houses," by Mr. H. B. Measures; "Small Suburban Houses," by Messrs. H. D. Searles-Wood and H. R. Appelbee. The list is not quite complete at present, but, judging from the above, the meetings ought to be well attended and the discussions useful and interesting.

THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.

This Association held its annual gathering at Merthyr Tydvil during the week commencing the 13th inst., under the presidency of Lord Aberdare. Though by no means an ideal rendezvous for archæologists, Merthyr possessed claims upon the Cambrian Association which could not be gainsaid, and as the antiquities of the neighbourhood had been practically unvisited by any one of the present generation, its selection was fully justified.

A late start was made on the 14th inst., the route lying to the north of the town, and involving a toilsome ascent of the steep hill that closes in the upper portion of the Merthyr valley. Morlais Castle was the first place visited. The ruins are those of a small but strong defensive post, erected by one of the Norman conquerors of Glamorgan to keep in check the constantly-recurring incursions of the Welsh hill-tribesmen. The country around is broken up into hills and valleys, and must have been exceedingly difficult for military operations during the Middle Ages. These, indeed, must have taken the form of predatory forays and desperate encounters of brave but untrained men rather than of stoutly-contested fights conducted under primitive rules of warfare. Morlais Castle could never have been held by more than a handful of men, for the sufficient reason that there was no room for them, but so strongly is the fortress posted upon a spur of limestone that a very small garrison would be sufficient to hold it against large numbers. The form of the castle was an irregular oval, the walls following the configuration of the ground. The keep was built at the southernmost corner, on the highest point of the space enclosed by the walls, and another strong tower occupied the northern corner, where the ground falls sharply away to the valley below. One side of the oval was defended by a deep moat, but the abrupt descent on the Brecknockshire side of the hill did not call for any such defence. The general features of the castle can be clearly made out, though it has suffered considerably since Buck paid it a visit, as his drawing shows the keep as then standing. A paper was read upon the spot by a local antiquary. Mr. G. T. Clark, in a paper upon the castle, written almost half a century ago and reprinted in his "Mediæval Military Architecture," refers to the recorded account of a quarrel that broke out between Gilbert de Clare, Earl of Gloucester and Hertford and Lord of Glamorgan, and Humphrey de Bohun, Earl of Hereford and Essex, at the close of the thirteenth century, the cause of trouble being the seizure by the former of a border castle which was claimed by the latter as belonging to his lordship of Brecknock. The *locus a quo* is supposed to be Morlais Castle, but this is by no means certain; and, indeed, the claims of another stronghold was on a subsequent day advocated by one of the ablest of Cambrian antiquaries, Colonel W. L. Morgan, R.E. It would have been desirable, therefore, to have had researches made into the public records, which are vastly more accessible at the present day than they were when Mr. Clark wrote. As Wales became pacified Morlais Castle became unnecessary, and its remoteness was against its transformation into a mediæval residence. It accordingly fell into disrepair, and in Leland's time was "in ruin." Mr. Clark found it difficult to refer it to any precise date, but conjectured, apparently more from the general plan of the building than from any other evidence, that it belonged to "the latter period of the Early English style;" and this conclusion may be safely accepted. It may, however, be additionally suggested that historical records will probably be found to show that it was dismantled after the suppression of a serious revolt of a Welsh chieftain in the year 1316.

The party next undertook a long drive along the ridge called Cefn Gelligaer, which divides the Rhymney valley from that of Merthyr. A halt was called at a lonely spot where is a tiny chapel called Capel Brithdir. Here, no doubt, existed from very early times a small ecclesiastical edifice, but of such a building not the faintest trace exists. The present chapel was built upon the site, and no doubt upon the foundations of the earlier edifice, by the present Marquis of Bute. It seems somewhat like looking a gift horse in the mouth to express a regret that while expending money in the complete rebuilding of the ancient little chapel his lordship did not think it proper to make the new edifice a little less barnlike than it actually is. A few yards from the church is a famous inscribed stone commemorating an early Briton who bore the Latinised name of Tegernacus—the Welsh Teyrnog, "kingly," or, perhaps, "of royal race." The stone should be removed into the church, or in some way protected from the pick of the ubiquitous miner or the more gentle but no less destructive agencies of Nature.

The next item upon the programme was Capel Gwladys, of which it was said that "the foundations of this chapel, consisting of west tower, nave, and chancel, within an enclosure, are still visible." Time, however, did not permit of a visit, and the party were left lamenting that the opportunity of connecting this monastic outpost with one of the great foundations of the Vale of Glamorgan had been lost. Considering that ecclesiastical buildings, especially those which might be supposed to mark the site of early monastic foundations, are not numerous in the district, it is unfortunate that the ever-lengthening delays compelled the omission of one or two items from the programme of each day's work. It was, however, necessary at all costs to push on to Gelligaer, a small village on the brow of an eminence commanding the Taff valley. Here, there unquestionably had existed a Roman camp. The site is about midway between Cardiff, where recent excavations abundantly prove the presence of an important Roman station, and Y Gaer, near Brecon, an equally well authenticated Roman camp. At Gelligaer, the Merthyr party were met by a body of members of the Cardiff Naturalist Society, by whom the present excavations are being conducted. The remains were very lucidly explained by Mr. John Ward, the curator of the Cardiff public museum, who had also thoughtfully provided a plan brought quite up to date. The camp, which is as nearly as possible a square of 350 ft., was evidently hurriedly constructed, but certain features seem to show that it was intended for lengthened occupation. Its situation in the Silurian district would lead us to regard it as having been established during the campaign which resulted in the fall of the British chieftain whom we have latterly been taught to call Caratacos, or in the operations subsequent to that British disaster. We know that they retired to their fastnesses after the capture of their leader, and that in the guerilla fighting which ensued they surprised and cut off two cohorts of auxiliaries. Directly the camps at Cardiff and Y Gaer were decided upon, an intermediate station would be necessary; and Gelligaer, without doubt, occupies the site of this stationary camp. The portions at present excavated are the four gates and a section of the northern corner of the camp. The agger consisted of the earth which had been thrown up from the ditch beyond, the earthen rampart being strengthened by retaining walls on both its inner and outer faces. Guard chambers existed on either side of the four portals, and towers, probably very squat, crowned each angle and rose intermediately between the angles and the gateways. The raised sill of the south-west portal is still in situ, and shows the hollows worn by the chariot wheels and the sockets in which the pivots of the great doors turned. Strange to say, the finds have otherwise proved most disappointing, and no trace of an inscription has been met with. It would seem that the camp had been rapidly constructed and as hurriedly deserted, though it may have been again occupied in the latter days of the Roman power in this island. The main reason for its existence would be removed by the pacification of the tribes who dwelt in the district, and as there is no record of their having given trouble to their conquerors after their early subjugation, the above conclusion would seem to be warranted by the silence of history. Of Gelligaer Church it suffices to state that it possesses internally no feature of interest to the antiquary. It has a battlemented tower of two stages containing two small lights dating from the fourteenth century. Not far from the village of Gelligaer the carriages drew up for the inspection of a stone called Maen Cattwg, the stone of Cattwg, anent which a heated controversy is raging in the local prints. The stone, a sandstone boulder, bears no inscription, but has on its surface a cluster of cup-shaped holes of various depths, and the point at issue is whether these depressions are the work of man or of Nature. The visitors were as divided as the local controversialists. The writer of the present notice inclines to the side of the sceptics, but it should be stated that so competent an authority as Col. W. E. Morgan, R.E., late of the Ordnance Survey Department, was strongly of opinion that the cavities had been artificially made, but their purpose could not be conjectured. On the return journey a much too brief visit was paid to Llancaiach House, a fine specimen of a country gentleman's residence built at the opening of the seventeenth century. The builder was a Prichard, a cadet branch of the great Welsh house of the Lewises of Van. This family was intensely loyal to the Stuarts, and it is said on the authority of the Iter Carolinum that Charles I. was sheltered in this mansion in the year 1645. The king's bedroom is, of course, pointed out. Externally the house has been subjected to no alteration, and the substantial manner in which it was constructed has enabled it to withstand the influences of time so successfully as to leave it an interesting study to the student of domestic architecture. The internal arrangements are not so perfect, though there are little, if any, signs of structural alterations. But the timber, especially the old oaken staircase, has been sadly neglected, and is now for the most part past praying for. The domestic appointments were also unusually complete and interesting, and the whole building and its contents would well repay careful description as an admirable survival of the house and home of a country gentleman of moderate estate three hundred years ago. A paper upon the family of Prichard of Llancaiach had been prepared by Mr. Charles Wilkins, F.G.S., and was to have been read upon the site of their greatness, but the indisposition of the author and the flight of time unfortunately compelled its postponement. At the evening meeting, Lord Aberdare, in his Presidential address, dealt with the career of the late Mr. G. T. Clark as railway engineer and, later, as a pioneer of the iron industry of South Wales. With Mr. Clark's important contributions to history and archæology his lordship told his audience that he was not competent to deal. A paper on Llantrissant Castle by Mr. J. S. Corbett was followed by one upon the historic house and family of Van, written by the same gentleman.

On Wednesday the parish church of Merthyr, dedicated to St. Tydvil the Martyr, was visited. Whatever may be the true inwardness of the Welsh traditions respecting the planting and spread of Christianity, the three holy families of Britain, and a host of other ecclesiological and hagiological puzzles, of the truth of which it is advisable to express no doubt whilst in Wales, there can be little question that a church, probably a small oratory at commence-

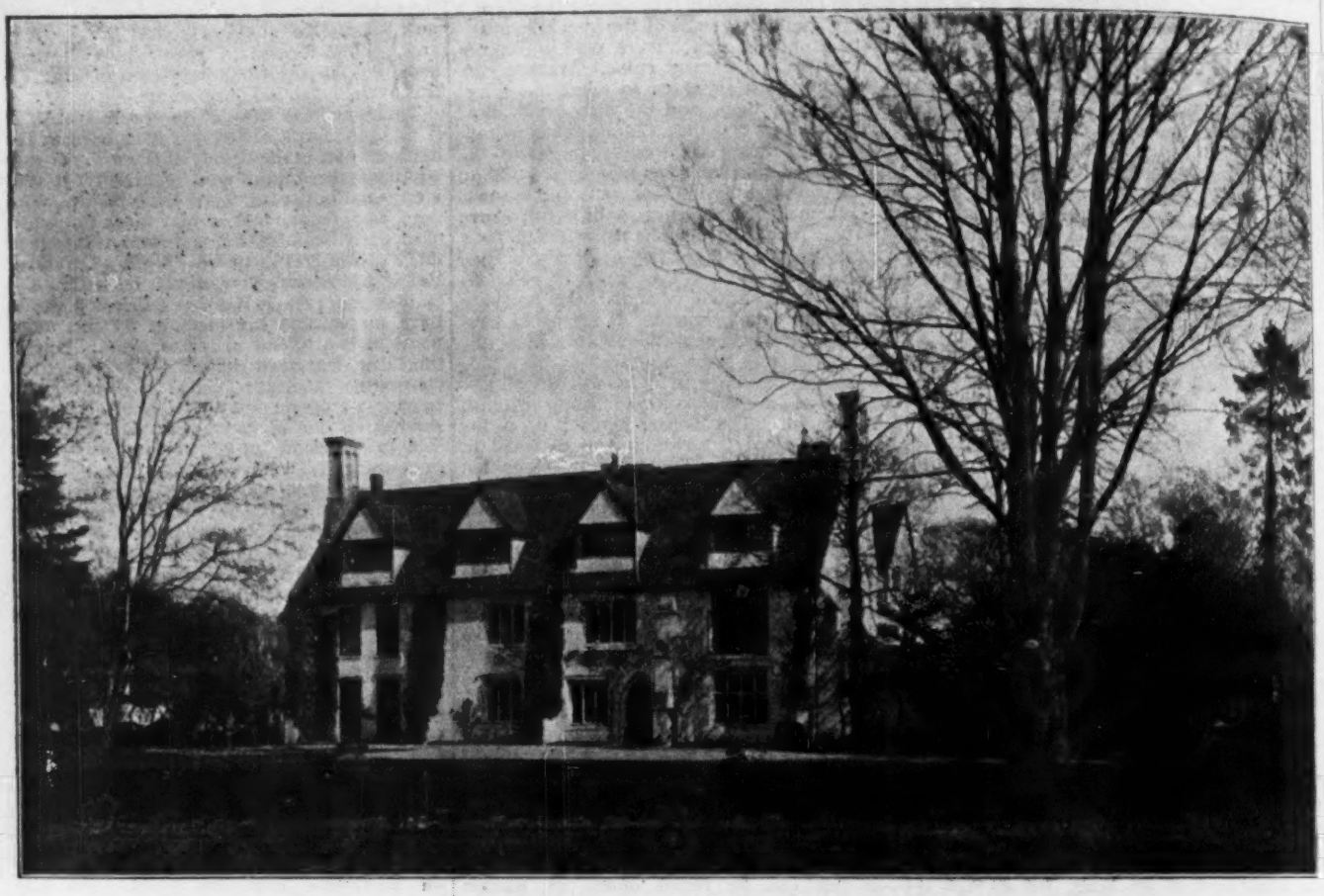
ment, was founded on the site of or near the present parish church of Merthyr long before the adjacent parts of the predominant partner had thought of forsaking their heathen ways. The vicissitudes of that tiny church have not been recorded. We do know, however, that about twenty years ago the parish church of Merthyr was a poor, mean, dilapidated structure. Then came a new rector (the present), who called in the late Mr. Pearson, and the building was restored to its present state. An ancient inscribed stone is built upside down in one of the outer walls, and you are gravely assured by inhabitants of ancient days and long memories that the parish church of Merthyr always occupied that site, a statement corroborated by the presence of a squalid churchyard; but a visitor without these evidences might well determine to look for memorials of St. Tydvil elsewhere than upon the site of her second martyrdom. The party went off by train to Pontypridd, and thence by cars to Llantrissant. This little town, which, with Cowbridge and Cardiff, returns a member to the Imperial Parliament, is built upon the first range of hills that rises from the low-lying district of the shire. It may be well here to state that Glamorgan naturally divides itself into the hill country and the plain. The first is termed in Welsh the "blaenau," and the latter the "bro." This geographical conformation has impressed itself upon the social and political history of the county. The plain is the land of the Normans, of the monasteries and of the wealthy homesteads; the "bro" is the land of the Welshman, of the mediæval freebooter, of the minerals. The castles are dotted about here and there, just where the Norman barons found they were wanted in order to keep the Welsh in check. Llantrissant was one of the most southerly of these castles. It is represented to-day by no more than a fragment of its keep, but enough is left to enable us to ascribe its erection to the latter half of the thirteenth century. In Leland's time it was a ruin and a convenient quarry. The history of the borough would probably reveal many points of interest, but it has hitherto only been nibbled at. The earliest extant borough charter dates from A.D. 1346, and an illustration of how, in this country, the old is oftentimes found side by side with the modern is afforded by the fact that until the year 1886 the custom of electing a portreeve of the town was annually carried out by the constable of the castle. The church of Llantrissant consists of a nave and chancel of five arcades. It underwent alteration in the Late Decorated period, and again within recent years. The tower is low, of two stages, and battlemented, and was rebuilt for the greater part of its height in the fifteenth century. A comparatively modern pit for casting the bells has been discovered in the basement of the tower. Built into the north wall of the interior is an effigy which produced some controversy. It is traditionally regarded as the counterfeit presentment of Cadwgan Vawr, sixth in descent from Einion ap Collwyn, one of the Welsh tribal chieftains of about the time of the conquest of William I. The opinion of the visitors, however, was that the effigy represented a palmer, though the figure is girt with a short sword, and has none of the accompaniments of the vagabond class of mediæval England. The figure is dressed in a long robe encircled by a girdle and falling below the knee, where it was fastened A defaced head resting upon a square cushion has been built in above the trunk in such a manner as to lead some of the party to consider the connexion between the parts as purely accidental. At all events, the effigy calls for careful drawing and examination. The font, which is of the thirteenth century, has been adequately described and delineated in *Arch. Cambrensis*, Fifth Series, Vol. XIII., p. 269. An interesting slab, now built into the external wall on the north side, bears a cross the top of which is circular, having the arms of the cross extended to the circumference of the circle and with two smaller crosses, one on each side of the extended arm. The foot of the larger cross has itself been made into a cross by a short lateral cut about two inches from its termination. The whole has an appearance of antiquity which we do not feel sure careful examination would not dissipate. The next halt was at what was termed in the programme St. Cawrdaf's Monastery, but the character of the remains seems to have occasioned considerable local disagreement. One antiquary, while remaining dubious of the nature of the building now in ruins, suspects it to occupy the site of a Roman building, some of the foundations and all the stones of which were used in the construction of the present ruins. Another considers the existing walls to mark the site of deserted cowsheds, and the only point clear to the visitors was that Glamorganshire antiquaries had taken no trouble to settle the fundamental question what manner of building was represented by the few walls and mounds of earth scattered about on a little hill above Miskyn. Whatever may be the evidence for a Roman building, there has evidently, at one time, existed at this spot a small religious house. The church occupied the northern side of the establishment. It seems to have had no transepts, but at the south side of the eastern end was what appeared to be a side chapel, still retaining in its southern wall the remains of a deeply-splayed Early English single light. The cloister situated upon the southern side of the church was so small in area as to occasion doubts of its character. On the northern side of the cloister an entrance leads into the southern aisle of the church, and on its eastern side, at the north-eastern angle, seemed to be an entrance into the chapel already spoken of, which ran behind that side of the cloister. Westward of the cloister was a building which was probably the dwelling-place of the inmates, but this, from the location of the building, is no more than conjecture. Heaps of ruins lie around, especially to the south and west of the structures just described, but time would not admit of their inspection. Sufficient, however, was apparent to show that there exist at this spot traces of buildings which call for careful examination by experts. It is impossible not to speculate upon the character and history of the monastic establishment settled in this beautiful, but retired, situation. Its dedication to St. Cawrdaf —if this can be relied upon, for neither the name nor the site is marked upon the old 1-in. Ordnance map — points to a Welsh foundation erected "before the base laws of servitude began," and there are indications that some of the great monastic houses of the plain country, notably Margam, were born of much humbler parentage in the "bro."

The party hurried away to see the Marquis of Bute's restoration of Castell Coch, in order to do which Castell-y-Mynach House was hurried through and the Llaniltern inscribed stone omitted altogether. Castell Coch, so called from the red tint of its materials, is the southernmost of the fortresses built by the Normano-English barons, it being no more than seven or eight miles from Cardiff. Included with the lordship of Glamorgan, it passed into the possession of the Herberts, and through them to the Butes. It may be described as consisting of three towers, placed as though it had been intended to have had four in the form of a square, but having had one omitted. In the curtain between two of the towers was the hall of the castle, commanding a lovely prospect of the winding Taff on its way to the sea. From the tower at the south-eastern angle, where was the entrance to the tower at the north-eastern angle, the curtain consisted of a solid wall carrying a rampart, but encumbered by no buildings. There is no tower at the north-western angle, the wall being continued upon a curve until it meets the south-western tower; the exterior face of this wall is about 80 ft. in length, and the chord of the arc about 60 ft. Mr. Clark thinks this wall was found to be of insufficient breadth for the use of military engines, and a parallel wall was accordingly built within and against it. The platforms communicated with the various towers, the hall, and the courtyard. The whole has been restored by the present Marquis of Bute in strict accordance, we are told, with what has been ascertained of the original structure. The towers are now capped with dwarf spires covered by red tiles, so that the structure has now the appearance of Moselle Castle dropped down upon the banks of the Taff. We read, however, that before its restoration the tower at the south-western angle was flat-roofed, as were no doubt the other towers, so that the present foreign appearance of the building is a concession to the picturesque. The interior rooms, though following their original lines, as, indeed, they could not well refrain from doing, have been decorated with a lavishness and taste that, to say the least, are somewhat out of harmony with the massive severity and business-like character of the external structure. Time did not permit of the examination of the outer defences, if any now exist. No guide described the fortress, and no one seemed to know anything more about it than the small modicum of information contained in the programme.

Thursday was devoted to the hilly district lying to the north of Merthyr, which forms the southern part of the county of Brecon. A stop was made three miles west of Merthyr to visit a cross cut in the turf upon the hill-side. The guide-book stated that it may mark the grave of an early Goidelic Christian, and in favour of this hypothesis is its name of Bedd-y-Gwyddel. But if a Goidelic Christian was buried here, it is much more likely that his tribesmen would have perpetuated his memory by the more usual method of an inscribed stone. One of the latter was seen a little further on, at a charming residence called Y Vedw Hir, bearing a cross on one of its faces, and ogam notches on one of its angles. The latter are said to represent the letters Gluvoca, which in modern Welsh would take the form of Glywog. A long drive took the party to the ruins of another Castell Coch. At the apex of a diamond-shaped piece of ground above the rivers Lliw and Dringarth, which rendered it practically impregnable on two of its sides, had been built a small castle, the history of which, the visitors were informed by Colonel Morgan, R.E., was a complete blank. It comprised a small tower, an inner ward, another tower at the edge of the scarp, a ditch upon the landward side, and an outer ward defended by a dyke upon the northern side, which was open to direct attack. The principal tower had been vaulted, but the masonry was throughout inferior. Colonel Morgan thought it had been a forest castle, possibly erected by the Humphrey de Bohun, Earl of Brecknock, of A.D. 1295, to safeguard his immense forest of Brecknock, which stretched away for miles to the northward from this point. He was inclined to think the occasion of the quarrel between De Clare and De Bohun, to which allusion has already been made, was the seizure of this post rather than Morlais Castle, which had been visited a couple of days previously.

The party next went on to a stone called Maen Madoc. The stone lies about a mile from the very rough road running from Brecon to Merthyr, along the line of an undoubtedly ancient trackway, said to be Roman in origin. The stone is an immense monolith, bearing an inscription commemorative of one Dervacus. No doubt exists as to the reading, and the party walked back along the Roman roadway to the carriages. Ystradfellte, where lunch was laid in the open air, is a village of two inns and about four houses. It also possesses a church, which, in turn, possesses no feature of interest to archæologists. On the return journey a halt was made at Aberpergwm, in the beautiful vale of Neath, a house famed in Welsh literary annals of the first half of the present century for the able and patriotic men and women who dwelt therein. The owner possesses a very fair collection of armour.

The final excursion was to Cardiff, and upon arrival there a move was at once made to the castle. The present residence of the Marquises of Bute occupies one corner of a quadrangle which has long been regarded as having formed a Roman castrum. Two sides and portion of a third side of the quadrangle still remain in the external form of immense banks of earth; the remaining portion of the third side is taken up with the mediæval castle wall, which has been restored by the present Marquis of Bute; and the fourth or western side is occupied by the range of buildings constituting the modern residence. Very briefly, the history of Cardiff Castle is as follows:—After the departure of the Romans the district seems to have been harried by predatory Gaels, intrusive Teutons, and piratical Scandinavians. Hordes belonging to some of those races, perhaps to all of them in succession, probably occupied the strong defensive position left by the Romans. One body of strangers piled a big bank of earth upon what remained of the stone rampart of the Romans, threw up a mound, and erected a fortalice in the north-western corner of the ancient camp. The Norman, when he came, continued the same practical policy. A stone keep took the place of the stockade upon the mound, whence it still overshadows the grassy enclosure beneath it. The earthern walls on the south and east, and on the north to the point of junction with the keep at the north-western corner, were still further raised



Clare Priory, Suffolk.

the earth being obtained by the re-excavation of the Roman ditch. The enclosed area was divided into two unequal parts by a stout wall which extended from the approach to the new keep to the middle of the southern rampart. In the smaller area thus formed the mediæval dwellings were constructed, and upon its western side stands the modern mansion. The Norman wall has been removed, thus leaving the centre of the enclosure free of buildings, and materially assisting the imaginary construction of the original Roman encampment. The most important discoveries have been made upon the northern side of the camp, where the north gate has been uncovered. This is said to be the most perfect Roman gateway yet brought to light in this country. It was polygonal in shape, and was constructed upon a rounded foundation. The immense mound of earth thrown up upon it after its partial destruction was faced by a strong wall built by the Normans above the Roman masonry. With the exception of the point in the northern rampart where stood this fine gateway, the earthen banks have been suffered to remain, but a gallery has been pierced through almost their entire length the exterior wall of which consists of the restored Norman walling. Beneath lies the Roman work. In course of tracing the line of the mediæval curtain the bastions of the older camp were discovered at intervals; these Mr. Ward, of Cardiff, considers formed no part of the original plan of the camp. After a lucid explanation of the work from Mr. Ward, the party were conducted through the modern house, and a few examined the Norman keep, of which the shell only remains.

A move was next made to the site of a house of Dominican Friars, which is situated within the modern castle grounds. The church and its attendant buildings had practically disappeared, but their several positions have been recovered upon excavation conducted by Mr. C. B. Fowler, F.R.I.B.A. To mark the site in an unmistakable manner, the turf that had gathered over it has been replaced by red tiles, which cover the ground area of the different buildings. The piers of the nave arcade within the church are represented by hollow squares of brickwork, which are contrived "a double debt to pay," inasmuch as they also form exaggerated flower-pots. Many of the tiles bear heraldic designs, said to have been reproduced from the fragments obtained during the excavations, and with the arms of the present Marquis introduced here and there. Later on it was elicited that the site of a Franciscan friary of considerable historic importance, where excavations are in progress, was being treated in a similar manner. It remained unvisited. No effort appears to have been made to trace the history of these religious establishments from public or private records, and consequently all manner of improbable stories are gravely related of them. The house of the Black Friars is stated to have perished during the Glendower troubles, that premature Cromwell having rased it to the ground. It may be that the house was burnt at some time or other, for Mr. Fowler found traces of fire in the ruins; but the names of its inmates at the time of its seizure by King Henry VIII. show it to have been fairly flourishing and to have been a thoroughly Welsh establishment.

A few of the party afterwards visited Llandaff Cathedral, whilst a large number proceeded to Caerphilly Castle. Both bands reunited at Merthyr, where, at a meeting in the evening, the usual complimentary votes of thanks to the local officials were tendered, and passed with acclamation.

It is impossible to speak of the Merthyr meeting of the Cambrian Archæological Association as having proved an unqualified success. The attendance was below the average, the extent of country covered by the excursions was too extensive, the arrangements might have been better, and very little was known of most of the objects visited. The latter, again, comprised no single item of first-class importance with the exception of the Roman work at Cardiff Castle, and of those of minor interest several have been irretrievably spoiled for the antiquary.

Electric Light, Battersea.—The foundation-stone of a new central electric light generating station, which is to be erected in Lombard-road, Battersea, at a cost of 57,000*l*., was laid on Saturday last by Mr. W. Matthews, chairman of the local vestry. Professor Kennedy is the electrical engineer, and Mr. Stanley Peach the architect of the buildings. It is proposed at the commencement to erect 240 arc lamps, which will be distributed over a distance of 13 miles. The work of laying the mains began on February 5, and out of 13 miles 11 have been completed. All the work is being done by direct employment. If required, it is intended to introduce the light to private houses, and it is hoped to place it within reach of the poorer inhabitants by supplying fittings without prepayment. Commencing with a charge of 5½d. per unit, it is hoped to reduce it to 5d.

CLARE PRIORY, SUFFOLK.

The illustration of this pleasing old country house was made to accompany our report of the Architectural Association Excursion; but though it was on the line of route and the President and one or two members called at the house, it was not actually visited by the excursion party as a whole, and as we were pressed for space that week we omitted it.

It makes so pretty a picture, however, of "an English home," that it is worth giving independently of the occasion for which it was originally prepared.

The illustration is from a photograph by Mr. T. Stokoe, of Clare.

STOWE HOUSE, BUCKINGHAM.

Stowe House, near Buckingham, was recently visited by a party of the Architectural Association in an all-day visit. The distance, about sixty miles from town, made the visit necessarily somewhat brief in spite of the late hour at which the party reached London on their return. Thanks to the kindness of the agent, who conducted the party through the house and grounds, the members were able to see everything that time permitted them to visit in detail, as a leisurely pace was adopted which was as delightful as it is unusual in the case of show-places.

The feature at Stowe, besides the great size of the house, is the extent of the pleasure grounds, which may perhaps be best described as a glorified Kew Gardens, with many and more substantial temples dotted about. To visit all these would be a day's work if one lived on the spot, while the task of determining the rightful architect of each might fill up a summer holiday.

There would seem to be a specially large amount of confusion in the accounts of Stowe, and, though the party were in anything but a critical mood, the difference between the front and back façades of the house sufficed to give rise to some suspicions as to the unity of the design. It appears, in fact, from a comparison of Seeley's account of 1769 with that by Britton and Brayley of 1801 that the whole south front is a mask added on to the older house at apparently the later date. The quadrant corridors of the north or entrance front may also well be of the same period, leaving a core of old house of a recognisable eighteenth-century character.

The great length of Stowe is one of its main features; it is usually given as 916 ft., but, architecturally speaking, the garden façade would not appear to be more than 450 ft. at the outside, so that the rest must be made up in offices and courtyard walls, &c. This great length would appear to be the result of additions, of which the drawings in Seeley show traces. The garden front in 1769 was a broken-up, possibly picturesque, group having a central portico, flanked by two towers, a feature repeated on a smaller scale at either end.

If the grand façade is only of 1801, it is a remarkably good piece of work for that date. It is bolder in character than Adam work, with which it has some affinities, while the mouldings and details are more carefully executed than would be usual with Wyatt, whose name has been mentioned in connexion with the design. In this uncertainty one authority gives the credit to the noble client, but the disbeliever in amateur architects may reflect that some Italians were there to help.

Thus, Signor Borra is mentioned in the account of 1769 as adding to Kent's work, while Signor Valdre appears in that of 1801. To the latter is assigned the great oval saloon, with its frieze after a Roman triumph surmounted by a top-lighted dome that exhibits the working-out of an interesting geometrical problem, arising from the adjustment of a true oval skylight on to a truncated dome, presumably of a different curvature on plan. The entrance hall behind this central saloon, an apartment 36 ft. by 22 ft. 9 in., has a painted and coved ceiling, certainly of Kent's work, as it resembles work of his such as that which we see at Kensington Palace.

A much greater man, Sir John Vanbrugh, is mentioned as the author of some of the garden temples, but nothing was seen that looked very characteristic of him, unless it were the two bold pavilions, each about 28 ft. square, and large in scale for their design, placed on the main or Oxford avenue up to the house. One of these is the agent's house, being now in two stories, obtained possibly by the insertion of a floor. They would seem originally to have been connected by a gateway, designed by Kent, but cleared away by Signor Borra, who is said to have altered the pavilions, but in what way is not clear, unless he inserted the floors, and perhaps added the quadrangular dome with circular lantern over, which now crowns each block. The temples of Bacchus and Venus are also ascribed to Vanbrugh. The first is a rusticated temple about 20 ft. by 18 ft. inside measure. The rustication extends into the spandrel of the pediment, ignoring the cornice below, which is a strange feature of the design. This structure is flanked by some picturesquely sculptured terms. Of the temple of Venus the party could only notice the grouping at a distance. It has a raised centre with quadrant arms and boldly advanced wing blocks, having pediments on four faces. It attracted attention because whereas the weakness of the great south façade is the want of a stronger centre, and this little design shows just that sense of grouping and outline on which the fame of Vanbrugh will always depend, and which excuses the thousand and one defects of detail in his work that are so easy to point out.

The buildings in the gardens are of very varied merit, some being poor and amateurish in design, but that one which is now used as a museum was particularly noticed, as an elegant classical composition, with a point or two in the treatment of its detail that showed a close study of the problems of design in that style. It consisted of a domed centre with quadrant colonnades to the wings. This might be a work of Sir W. Chambers (?).

The interior of the house naturally excited the greatest interest. Owing, however, to the various changes, the names of the apartments are differently given, rendering the descriptions somewhat difficult to follow. A general idea of the great suite of rooms embraced by the grand southern façade of about 450 ft. in length may, however, be given as follows:—On the extreme left a state bedroom (or crimson drawing-room ?), Greek cross in plan, with closets in the angles. This apartment is hung with crimson damask and ornamented with gilded Corinthian columns, and has on the ceiling the Garter, in relief and in heraldic colouring, as a centre-piece. Needless to say, this is a masterpiece of bad taste on the part of the amiable Kent. Signor Borra is reported as completing the work.

Next is a tapestry-room, illustrating the Siege of Liege, leading into a gallery 70 ft. by 25 ft., also called the State dining-room. This apartment is hung with Brussels tapestries and has two marble mantelpieces with wood carvings by Grinling Gibbons, treated as bronze panels. There are seven windows in the length, and it forms the curtain block between the raised wings and the centre mass of the façade. The latter comprises the great oval saloon (60 ft. by 43 ft. by 56 ft. 6 in. high), fronted by the hexastyle Corinthian portico, and flanked on either side by the State drawing-room and the music-room. Each of these is 50 ft. by 32 ft. by 22 ft. high, and is end lit towards the south with semicircular apsidal recesses at the back.

The corresponding curtain block on the right of centre is the great library, book-cased to the ceiling on three sides, with a light gallery at half the height along the cases. The ceiling has a cove sunk with octagonal coffering, the centre flat being richly ornamented in running bands of plaster-work relief.

The end block comprises three apartments, the blue and green drawing-rooms and a State bedroom (?).

The exigences of the old building doubtless account for the many blank windows, skilfully disguised, however, in the masking façade. The treatment is in two orders, the major Corinthian and the minor Ionic, both standing on a rusticated basement. There are thus thirty-one steps in two great flights up to the central portico of six columns of 3 ft. 7 in. diameter. They are advanced one bay of the intercolumniation, while the back wall is also well recessed, so that a grand effect of space within the portico is produced, and as the oval saloon behind is solely top lit, there are no windows to break up the background of the order; there is only a lofty door in the centre giving access to that apartment.

The line of the wide-spreading steps and of the portico is kept by a balustrade with copper vases on its dies, the space within, along the whole front on either side, being laid out formally with gravel paths between the box-clipped borders of the geometrically patterned beds.

It is interesting to recollect the impressions of this great house recorded by Sir Gilbert Scott, who was a native of Gawcott, about four miles from Stowe. After mentioning that to the great house the family made an annual pilgrimage each June, he goes on to say: "To us the approach was from the garden front, which is the great architectural façade, and looks south. Here the entrance is by an octastyle (*sic*) Corinthian portico, approached by a lofty flight of steps rising the height of a basement story. I well remember the kind of awe with which this stately approach inspired me, and how vast it appeared to my young imagination." And in another place: "the House was in point of fact a palace of delight, a wilderness of vertu and magnificence, of which upon the whole I have not seen an equal." He sums up his recollections by speaking of the noble owner of that day as falling under the curse of the man who lays field to field, ruining himself in purchasing estates with borrowed money, the interest of which exceeded the rental.

This brief article hardly conveys the extent and variety of Stowe even in its present condition. It is a subject that might be taken up in detail, in the absence of drawings and definite information, as to the exact architectural development of this great mansion.

HOUSES FOR AGRICULTURAL LABOURERS.—At the Wirral and Birkenhead Agricultural Show, the President, Mr. W. H. Lever, in the course of his address, remarked that, although the landowners and farmers were paying every attention to machinery and the production of crop, very little had been done towards providing the agricultural labourer with proper houses. To show what could be done in this direction, he was prepared to hand over to the committee a sum of 50*l.* a year for three years to be offered as premiums for the best plans or models of cottages suitable for that purpose.

BUILDING REGULATIONS IN THE SPEN VALLEY.—The Cleckheaton District Council met on the 14th inst., when the General Purposes Committee reported that they had instructed the clerk to call the attention of the Local Government Board to the disadvantage suffered by the town owing to the variation of building by-laws as between this and adjoining districts, with special reference to the building of back-to-back houses, and to suggest that the by-laws of the several districts should be identical. The resolution embodying this instruction had received the unanimous assent of the committee, and the minute was duly confirmed by the Council.

BUILDING TRADES GIFT TO THE NATION:

HOMES FOR DISABLED SOLDIERS.

WE are asked to announce the following further list of contributions to the Building Trades Gift to the Nation:—

The Birmingham Master Builders Association (first instalment) (per Mr. W. Sapcote)	£200	0	0
Workmen of Messrs. Perry & Co.	33	2	7
Mr. Paul Rhodes (Leeds)	9	14	6
Messrs. S. Goodall & Son	5	5	0
Workmen of Messrs. T. & W. Ide (per Mr. J. McMullon)	5	1	0
Workmen of Messrs. Perry & Co.	4	8	11
Employees of Messrs. S. Goodall & Son	4	8	0
Messrs. Harrison & Spooner and Workmen	3	18	0
Workmen of Messrs. Battley, Sons, & Holness	2	16	10
Mr. John Radford and Fellow-Workmen	2	16	0
Mr. J. F. Collinson and Workmen (Teddington)	2	12	0
Mr. Henry Child and Workmen	2	8	1
Workmen of Messrs. Matthew Bros. (per Mr. J. H. Perkins)	2	7	6
Workmen of Mr. A. Bothwell	2	2	0
Employees of Messrs. Lancaster & Co.	2	2	0
Mr. S. Spencer and Workmen	2	2	0
Messrs. F. Nicholls & Son	1	8	0
Mr. W. H. Quarterman and Workmen	1	7	6
Workmen of Messrs. Brown & Sweetland, New Southgate	1	5	6
The Cadogan Ironworks and Men	1	5	0
Employees of Mr. W. Banks	1	0	0
Mr. Wishey and Employees (per Mr. J. M. Hillam)	1	0	0
Mr. J. McLean, Canada	1	0	0
Mrs. McLean, Canada	1	0	0
Mr. Arthur Webb and Workmen, Stratford		17	0
Workmen of Mr. J. W. Heeps		7	0
Mr. W. A. Osborn		5	0
Workmen of Mr. T. Jones, Putney		4	0
Workmen of Mr. E. Haydn, Ryde		3	6

INTERNATIONAL HEALTH CONGRESS, PARIS.

THIS Congress began its sittings at the École de Médecine on August 10 and concluded them on Friday last week. About 2,000 members and delegates were present, among the principal Honorary Presidents being the President of the Council, M. Waldeck-Rousseau; the Minister of Commerce, M. Millerand; the leading Government and Municipal officials of the Department of the Seine and the City of Paris, Dr. Bergeron, M. Emile Trelat, Professor Corfield (Great Britain), Dr. Bartolette (U.S.A.), Dr. Kohler (Germany), Dr. Pagliani (Italy), &c. The President of the Congress was Professor Brouardel, and among the Vice-Presidents were M. Bechmann, Chief Engineer of Roads and Bridges, Dr. Cornil, Dr. Lande, Dr. A. J. Martin (General Secretary), &c. On the opening day two sittings were held, a morning one at which Dr. Martin gave details of the programme of proceedings as finally fixed, and the sittings of the sections, which were all held in various halls and lecture-rooms of the School of Medicine; and an afternoon sitting formally to inaugurate the Congress and to give a welcome to the delegates. The delegates were also invited to a State reception held in the afternoon at the Elysée, when the President of the Republic and Mme. Loubet received in State the Shah of Persia and his entourage and a large number of other distinguished visitors, with several thousands of the delegates to other congresses being simultaneously held in Paris.

The first sittings of the sections of the Health Congress, which numbered eight, were held on Saturday, the busiest section, and one of the most important, No. 3, occupying itself with questions of salubrity and the sciences of the architect and engineer applied to sanitation. In other sections bacteriology; insanitary houses; cremation; military, naval, and Colonial hygiene; sanitary legislation, administrative and international; hygiene of ships, railway trains, and other modes of transport; and finally, health statistics (demography) were questions discussed.

Water Supply of Towns.

Of the third section, one of the most numerously attended, M. Bechmann was President, and M. Félix Launay (Engineer of the Sanitation Works of the Seine) Secretary, the latter reading the first paper on "The Protection and Purification of the Sources of Water Supply

of Towns," which formed the basis of several days' discussions.

M. Launay presented the various points to be considered in a long paper. He said the question of legislation for the protection of sources of water supply was studied in England from 1866 to 1876, the Rivers Pollution Prevention Act of the latter year being the outcome of that study, which prescribed heavy fines for infractions of the Act.

In France the matter was much less advanced, the towns which had taken up the question of the purification of sewage being extremely few. M. Launay declared his opinion that the cases were very rare in which the refuse water of factories or the contents of sewers could be tolerated in streams. With regard to methods of sewage treatment, M. Launay declared his preference for irrigation systems where local circumstances permitted, but the systems of Mr Dibdin, and of Messrs. Cameron, Martin, & Co., which appeared to have given good results in England, might be substituted with the notable advantage that they avoided the difficulty of accumulations of sludge. Other methods of treatment were passed briefly under review.

With regard to the question of protection of sources of supply, he said it was not sufficient to have captured pure water; means must be found to keep up its purity. Legislation for the purpose of protecting sources of supply could not be too much insisted upon. The protection given should include as extensive an area as possible round the head of supply, and a sufficiently large protected zone should be regarded as a *sine quâ non* by Municipalities. The conclusions of a commission appointed to study this matter had demanded that a body of analysts and geologists should be organised to study chemical analyses and bacteriological reports of such sources, the State to bear all preliminary charges. A Bill would be submitted to the Chambers shortly to accomplish this purpose. The proposed Bill provides that when the deaths in a district exceed 22 per 1,000 the fact must be called to the attention of the administrators of the Department by the communal authorities, and the former must institute an inquiry into the sanitary condition of the district. Some experts go so far as to declare that it is impossible to reach perfection in providing great towns with a source of supply by the ordinary methods, and this desideratum will only be certainly attained when water for drinking purposes is manufactured artificially or is purified by chemical processes. It is in this direction that the sterilisation in bulk, of water for alimentary purposes has been suggested, either by utilising the oxydising properties of ozone or those of chloric peroxide. But it would, under such systems, have to be first settled whether they would do well to destroy only the pathogenic microbes and whether it would not be useful to leave inoffensive microbes. Would it not be better to endeavour to procure the purest possible source of natural supply and then to protect it from every kind of contamination? In summarising the paper at its conclusion, M. Launay suggested that the Congress should adopt a resolution, to be forwarded to the authorities, tending to procure the passing of the proposed Bill by Parliament with a double object: (*a*) the purification of rivers, the sanitation of town by treatment of sewage, and the utilisation of the contents of sewers; (*b*) for the supply of towns and rural districts with water for drinking purposes.

The propositions when formulated were discussed at a combined meeting of Sections I. and III., held on Thursday, August 16. Many of the speakers in the discussion were in favour of adding a third clause requiring that water at the point of delivery to the consumer should be sterilised. Eventually the resolution formulated as under was adopted. The Congress expresses the desire that Government should promulgate and apply effectively legislative measures (1) for the protection of streams against the refuse water of towns and factories; (2) for the defence and the preservation of the purity of waters utilised for the supply of towns, and if the water supply be suspected, or the water be contaminable, it ought to be sterilised.

The most important subject discussed in this section on Monday was the sanitation of the interior of houses connected with the public sewer; necessary regulations and appliances to secure efficient inspection and observation; reports being presented on the subject by MM. Lacau and Masson (Paris), and Mr. Alfred Roechling (Sanitary Engineer, Leicester). M. Lacau (Architect and Vice-President of the Society of Sanitary Engineers and Architects of France) and M. Louis Masson (Engineer of the Paris Sewerage Works) held that all sanitarians are now agreed that pure water, pure air, and abundant light are the three essential, indispensable factors in the salubrity of the house. The first preoccupation of the sanitary engineer and architect ought therefore to be, how to supply pure water and salubrious air throughout a dwelling-house. Admitting that the question of a pure supply has been solved, it remains to ascertain whether there is not some risk of contamination from contact with sources of impurity. It is necessary to get rid as rapidly as possible of all refuse matters, whether from the kitchen, the bath, or the closet. Ventilation was intended to supply pure air in abundance, and it had been amply treated by Sir Douglas Galton, of London, and M. Emile Trelat, of Paris, in previous congresses, but their salutary teaching had not produced sufficient practical application in the habitation, which still remained, to a great extent, unendowed in this respect.

With regard to the disposal of house refuse, the method of burning it on the spot was preferred, for which these experts say it is only necessary to have a furnace of special design in the kitchen to permit of the rapid cremation of the detritus without smell or emanations. The conclusions of the report generally agreed with the opinions of the most advanced experts in England, but the reporters' views upon the merits of the disconnecting trap will hardly be accepted by English sanitarians. They regard the direct connexion of the house drains and pipes with the public sewer as preferable to the disconnecting system, which they thought had been adopted in England on account of the defective form of English drains. It was admitted that if sewer air is considered as the vehicle of infectious germs the employment of disconnecting devices gives the greatest security, but this was declared incompatible with our present knowledge of the principles of the propagation of diseases, and they claimed that security can be obtained by means which have not the inconveniences of the disconnecting system. An old experiment at the Sanitary Institute was cited to prove that from 20 to 60 per cent. of matters from a water-closet may remain in the trap, the average being about 30 per cent. Powerful flushes which imply a great waste of water are necessary where the trap is used. The conclusion was arrived at that the disconnecting trap ought to be suppressed, and that to ensure proper ventilation in the pipes and house drains the prolongation of rain and other pipes will suffice if the orifice is left free. The air will thus constantly circulate through the conduits of the house, and the public sewer, and the oxygen present will burn the noxious microbes as they are produced.

In the discussion which followed, the disconnecting trap was defended by Mr. Alfred Roechling (Leicester), Mr. A. Smith (London), and other speakers. Mr. Roechling said it had been stated in the paper that the sewers in England were poorly constructed, a good deal of gas forming in them in consequence of their defects. He maintained that it was not so, and took a strong objection to the statement. There were a few cases, especially in the older parts of London, where the sewers were not so good as they might wish to see them, but where newer they were more scientifically carried out. As a rule the sewers in England were as good as they could be made, and they were managed as efficiently, if not better, than in other countries. It had been stated that in experiments made at the Sanitary Institute as much as 50 per cent. of foul matters had remained in the disconnecting trap, but it had not been stated that these experiments were connected with a water-closet, which was equivalent to a water-closet placed in a cellar. If we in England had houses of five or six stories high as in Paris, inhabited by from sixty to 100 people, and each person supplied with 60 gallons of water per day, the flush would be more than sufficient to clear away all deposits in the disconnecting trap. It was clear that if in the actual conditions under which the experiments were made only 50 per cent. of deposit remained in the trap, nothing at all would remain in it under ordinary circumstances. The experiments referred to might with greater justice be cited as an argument in favour of the adoption of the disconnecting trap as in England.

Mr. Adolphe Smith cited a case occurring at Maidstone during the late outbreak of typhoid in that town as an illustration of the danger of connecting the system of conduits in the house directly with the public sewer, as recommended in the report of Messrs. Lacau and Masson. If sewer air was not the direct vehicle in the propagation of disease, the breathing of impure air was a predisposing cause of disease, particularly when it took place in sleep, as appeared to have been the case in the instance of the propagation of typhoid referred to as occurring at Maidstone.

In the paper on the same subject subsequently read by Mr. Alfred Roechling, which was in French, the author laid down two rules as essential to ensure in a house the best sanitary conditions—first, to exclude all sewer gas; and second, to run as rapidly as possible into the public sewer all fæcal matters and refuse water produced in the house. The last of a series of conclusions proposed to make it obligatory on the part of Local Authorities, who prohibited the use of disconnecting traps, to ensure the proper condition and effective working of all the conduits in a house by undertaking the inspection and the cleansing of such conduits. The conclusions proposed were not adopted by the Section on the ground that they were either already generally admitted or were not of proved utility.

At the third sitting of the Section three important papers were discussed, each based upon the report of experts selected for the purpose by the Committee of Organisation. They were M. Emile Trelat, on the principles of road and street regulations in towns; M. Armand Gauthier and Professor Gréhant on the salubrity of the atmosphere in towns (smoke, dust, and noxious gas prevention); and M. Pucey on the distribution, aëration, and decoration of the interiors of dwelling-houses. A long and animated discussion was evoked by the report of Messrs. Armand Gauthier and Gréhant, in which M. Lacau, architect, &c., Dr. Berthod, Mynheer Symons (Holland), Mr. Adolphe Smith (London), M. Vaillant, Dr. Zahor (Prague), and several other speakers took part. The history and results of experiments, made principally in France and England, bearing upon the subject of combustion, were presented, the list ending with those found by a committee appointed to examine and report upon the smoke-consuming apparatus exhibited at South Kensington in 1882. These experiments were conducted by Professor Chandler Roberts, whose researches enabled the Committee to classify the different apparatus shown according to their smoke-consuming efficiency. The subsequent experiments made by M. Armand Gauthier on the atmosphere of Paris, the phenomena observed in the vicinity of the high furnaces of Cleator Moor, near Whitehaven, the experiments of Claude Bernard and of Professor Gréhant on the effects upon the blood, of breathing oxide of carbon and the gas in mines, were discussed in the report. The chief conclusion was that the insalubrity produced in the atmosphere of towns was much less redoubtable than might have been supposed *a priori*, but local causes might cause a dangerous accumulation of certain gases in certain quarters and certain houses near great factories or in densely populated places. The penalties imposed by the English laws on smoke abatement were generally approved by those who took part in the discussion. The Section eventually adopted the following resolution, proposed by M. Lacau:—"All the rooms of a dwelling ought to be perfectly ventilated. The air in it ought to be continually renewed, in winter as well as in summer, by the various means adopted for different climates, on the sole condition that no injury shall result from it to the health of the occupants."

At the last sitting of the Section, held on Friday, August 17, a large number of communications, written and oral, were considered. Among them was a proposal from M. Sormani recommending that in hospitals built on the pavilion principle, the longer axis of the buildings should be from north to south, in order to give the greatest amount of sunlight. M. Pützeys (Belgium) said that in Belgium no such general proposition would be accepted, because it was necessary to take into consideration the prevailing direction of the wind which differed in different localities

Dr. Mansel Howe presented a communication on the importance of good plumbers' work in maintaining sanitary conditions in dwelling-houses, and concluded with a resolution that only plumbers possessing certificates of competency from some properly constituted body of experts should be entrusted with the execution of plumbing work in connexion with the sanitary arrangements of houses. This was adopted by the Section, after incorporating an amendment, proposed by Professor Corfield (Vice-President of the Congress), providing that plumbers possessing such certificates of competency should execute plumbing work of the kind under the direction of competent professional men (such as architects, engineers, or other experts). A communication from Mr. S. H. Adams, of York, upon the bacterial treatment of sewage according to various English systems, a resumé of which was given in French by Mr. Adams, was listened to with great interest by the Section. The communication was illustrated by photographic views showing types of bacteria beds in England; of the Dibdin one-acre filter at Barking; of the Sutton beds of double contact type, the Hampton Works of triple contact type; and the author's own automatic apparatus for operating such beds. One of the views illustrated Colonel Ducat's aerating filters as working at Hendon. A cordial vote of thanks was tendered to Mr. Adams by the Section, which soon after concluded its sittings with a vote of thanks to M. Bechmann for his conduct in the chair, which was proposed by M. Emile Trélat, and seconded by Dr. Conrad, one of the delegates for Holland.

At the closing meeting of the Congress, held on Friday afternoon, all the presidents, vice-presidents, and secretaries of Sections assembled in general meeting under the presidency of Professor Brouardel, when the resolutions of the Sections were passed in review, and in one or two cases were modified before being confirmed. The final act of the Congress was the selection of Brussels for the meeting of the next Congress in 1903, a proposal which was warmly acclaimed and assented to, M. Pützeys acknowledging the honour on behalf of the King of the Belgians and his government.

THE BRITISH FIRE PREVENTION COMMITTEE:

TESTING OPERATIONS, 1899-1900.

WITH the close of the British Fire Prevention Committee's summer session the Chairman, Mr. Edwin O. Sachs, makes the following announcement regarding the fire tests carried out under the auspices of that body:—Since the Committee's incorporation, *i.e.*, during a period of eighteen months, there have been twelve tests with fire-resisting floors and two with ceilings, and there have been nine tests with fire-resisting partitions. There have been no less than twenty-three tests with different forms of wood and iron doors, and eight with various forms of glazing. Besides this there have been several odd tests with treated wood, with fire curtains, fire blinds, girder coverings, and safes. Altogether the tests number sixty-three. The reports on these sixty-three tests are embodied in forty-four publications, many of which are illustrated.

An analysis of the attendance at tests shows that, including the representatives of the Council, Executive, the various sub-committees, and the deputies of the general body of members, the attendance averaged at about forty. The working members of the Council were primarily Sir John Taylor, K.C.B. (H.M. Office of Works); Mr. Arthur Cates (lately Crown Surveyor), and Major-General Festing, F.R.S. (South Kensington Museum). Speaking generally, the testing station required the attendance of the Executive or its sub-committees practically once a week throughout the year, and the heaviest work fell on the shoulders of Messrs. Max Clarke, Hammond, Marsland, and Goad; whilst Mr. F. R. Farrow assisted on behalf of the commercial section on almost every occasion. Throughout the work the Executive has been ably assisted by their superintendent, Mr. Thomas Kissack, and by Mr. Taylor, the assistant secretary. As has already been announced the Committee has had to move its plant to new premises owing to the site on which they are now located at Regent's Park being taken up for railway purposes.

Correspondence.

To the Editor of THE BUILDER.

A HOUSE BY GIBBS IN LEICESTER-FIELDS.

SIR,—Can any one of your readers fix the situation of the house which James Gibbs (1682-1754) built in Leicester-fields for Sir Phillip Parker Long? Long's-court, until recently, was entered from the south-west angle of Green-street, Leicester-square, and from St. Martin's-street, lying around the north and east sides of the house, now No. 35, St. Martin's-street, which Sir Isaac Newton occupied from 1710 to 1725. That house in 1709 formed the Danish Embassy. Gibbs was in Italy in 1707, and, it seems, first settled in London in 1709 or 1710. I gather that he built the house for Sir Phillip Long in or about 1730. D. M.

THE ROYAL ARCHITECTURAL MUSEUM.

SIR,—For every good reason criticisms as to the present condition and future possibilities of this valuable institution are to be welcomed, and while it has been necessary to correct some erroneous statements which have appeared of late in the public press, I am sure the Council will be quite prepared to give their best consideration to any practical suggestions tending towards the improvement and increased utility of the Royal Architectural Museum.

It would exceed my duties to anticipate in any degree the work of the Council, but I may say that in the near future, after the vacation, it is hoped, when the Council meetings are resumed, some practical proposals may be determined on with a view of furthering their much desired object. The purport of this letter is to solicit opinions and proposals from architects and non-subscribers on the lines indicated.

No one can have been associated with the maintenance of this great collection of Gothic art without realising the need of its development on the one hand, and the lack of interest displayed in its welfare by the majority of the profession on the other. That these conditions are essentially inimical goes without saying.

To ask, however, for monetary aid during the period when the institution was in financial difficulties was quite hopeless, and any chance of augmenting the collection was then equally out of the question. The Museum is no longer hampered by debt, and the current expenses of the School of Art are more than covered by its income.

Architects and others are not invited to assist in a lifeless project or interest themselves in a dead cause. Whatever may have been the failings and shortcomings of the Gothic revival, it would indeed be a sorry day for the architecture of the future should students cease to make themselves acquainted with the best work of past periods and styles, particularly with the national style of Gothic, as represented by the masterpieces of architectural art got together with so much disinterested and loving zeal by the founders of this Museum for the sole purpose of facilitating such an intimate study of old work.

To meet contemporary needs it is clearly necessary to bring the collection more up to date and more in line with the types of design more currently in use. No doubt, had it been possible, it would have been a good thing to have supplemented the mediæval examples with specimens of Classic work and Renaissance detail some years ago. It was not possible under the circumstances, seeing that space, money, and the co-operation of architects and others were all in turn wanting, when for a good while every available effort had to be made to prevent the collection from being broken up and the premises closed entirely.

We are now free of that danger, but it must be admitted that the Museum is not realising in so complete a way as it might the special intentions of its foundation. With the affiliation of the Museum with the Royal Institute of British Architects and with the Architectural Association it ought to be relatively easy to vastly enhance its utility. At least such a project might form the basis of a central University of Architecture, for it remains a subject of much regret that architects have no such premises as the Institution of Civil Engineers or the Surveyors' Institution.

To those whose professional careers were more or less inspired by the enthusiasm of the Gothic revival it should be hardly necessary to recall the reality and thoroughness with which those who took part in that movement were animated. There is no need now to recount the history of the Gothic revival, in the origin of which the hopes of the future seemed to be centred in a rekindling of mediævalism. The thoroughness of those days, however, must be ever associated with the aspirations and principles so ably represented by Pugin, Scott, Burges, Street, and Butterfield. The best work of to-day is done by men in some degree actuated by the influence exercised by these enthusiastic workers, and for the evidence of the truth of this assertion instances scarcely need be quoted.

Drawings and plastic copies of old work may be cynically described as "the dry bones of architecture," but by the very nature of things they serve as the grammar of the art, without a knowledge of which no articulate expression or individually developed work is ever likely to be produced.

Such a collection as that already to be seen at Tufton-street must consequently have its uses at least as an index for reference. Those who love their art and realise therefore a keen pleasure in its development will, I am persuaded, afford a helping hand in thus making the Royal Architectural Museum worthy of its aim, a credit to the profession, and as useful as comprehensiveness can make it. A building ennobled by good sculpture obtains a charm secured by no other means. The inclusion of such names as our new President, Mr. Wm. Emerson, P.R.I.B.A., and Messrs. Aston Webb, A.R.A., John Belcher, A.R.A., G. F. Bodley, A.R.A., and George Frampton, A.R.A., among the Vice-Presidents should be an assurance of the Council's desire to perfect the Museum for the good of the greatest number and for art especially.

MAURICE B. ADAMS, *Hon. Sec.*

ACETYLENE *v.* GAS.

SIR,—In your issue of the 4th inst. you refer to the misleading statements of the makers of acetylene generators who represent that acetylene gives a light fifteen times greater than that obtained from coal gas.

As representative of the Giffre Electro-Chemical Company, Limited, an English company owning certainly the largest carbide works in Europe, I have had some little experience of acetylene, and should be obliged if you would spare me space to point out that the said makers do not overstate their case so very much.

Taking the figures recently published by Professor Vivian Lewes, Chief Gas Examiner to the City of London—and I take them, because I have noticed that Professor Lewes does not certainly show any undue bias in favour of acetylene as compared with coal gas—we find the following results of photometric tests:—

Flat-flame Burners for Coal Gas.

		Candles per Cubic ft.
Batswing Burner	No. 7 yields	2·44
,, ,,	No. 6 ,, ...	2·15
,, ,,	No. 5 ,, ...	1·87
,, ,,	No. 4 ,, ...	1·74

The same authority gives the following figures for acetylene:—

Bilwiller burner.	No. 5	of 76 c.p.,	yields	38	candles per ft.	
	No. 4	48 ,,	,,	49	,,	,,
	No. 3	28 ,,	,,	37·3	,,	,,
Billwiller all steatite.	No. 5	36 ,,	,,	36	,,	,,
	No. 4	30 ,,	,,	37·5	,,	,,
	No. 3	30 ,,	,,	40	,,	,,
	No. 2	20 ,,	,,	33	,,	,,
Schwarz half-moon type.	No. 5	34 ,,	,,	37·7	,,	,,
	No. 4	36 ,,	,,	36	,,	,,
	No. 3	30 ,,	,,	30	,,	,,
	No. 2	18 ,,	,,	36	,,	,,

Professor Lewes is careful to point out himself that "he is perfectly aware that these results are in many cases far lower than the results claimed," and I may mention that I have before me the figures for a very large installation in Germany (using acetylene generated on proper principles and properly purified), showing better results from burners which had been in use a year and a half without cleaning. Even Professor Lewes's figures show, however, that the smaller (No. 2) acetylene burners give over fourteen times as much light per cubic foot as the largest coal-gas burner. If we take further Professor Lewes's figures for the Union Jet coal-gas burner, largest size (No. 7), giving 2·09 candles per cubic foot, the comparison in favour of the No. 2 acetylene burner is as about 16½ to 1.

Now, as to incandescent mantles. The same authority states on page 568 of his recently-published work that the Welsbach large mantle gives 16·6 candles per foot of coal gas of 16 candles *measured horizontally*. In these last two words lies the pith of the whole matter, for, except in the laboratory or the shops of the Welsbach Company, the incandescent mantle is practically never placed so as to be on a level with the object it has chiefly to illuminate; on the contrary, it is nearly always much nearer a position vertically above the object—at any rate, for domestic uses.

Professor Lewes himself states that in domestic use "the illumination shed upon our book or writing is derived from a source at from 40 deg. to 90 deg. above it," and he gives the following results to show how the candle-power goes down as the object illuminated is placed more and more beneath the horizontal:—

Horizontal—Welsbach	16·6 c.	Acetylene	40 c. per ft
Angle of 20 deg.	,, 16·6 ,,	,,	40 ,,
,, 40 deg.	,, 11·1 ,,	,,	38 ,,
,, 60 deg.	,, 2 ,,	,,	30 ,,
,, 70 deg.	,, (unreadable)	,,	26 ,,
,, 80 deg.	,, ,,	,,	20 ,,
,, 90 deg.	,, ,,	,,	5 ,,

From this table it is evident that at an angle of 60 deg., the angle probably most used for domestic purposes, acetylene gives fifteen times as much ligh

t

as a Welsbach mantle; as a matter of fact, the proportion is much more in favour of acetylene, as the following will show.

The 166 candles per foot for the Welsbach mantle are emitted by new mantles only. Fähndrich, manager of the Vienna gasworks, states that the depreciation is as follows:—

After burning	48 hours	the light decreased	12·9	p.c.
"	"	192 "	"	"	35·8 "
"	"	384 "	"	"	65 "

Thus a month's burning in winter (six hours per day) reduces the light by more than one-third.

I have, however, reason to believe that in actual practice the results are far more unfavourable. As a rule, experiments for determining the candles given are carried on in laboratories, where the conditions are totally different to those obtaining where the mantles are actually used.

I therefore carried out a series of photometric tests in a London dining-room, morning-room, and drawing-room with mantles used on wall brackets and on pendants hanging from the ceilings. In the case of the wall brackets the figures obtained bore out those of Fähndrich fairly well, except where the light was exposed to draughts or was very near a door. The pendants, however, showed much poorer results, the depreciation in one particular case (pendant hanging from a ceiling beneath a room used as a nursery) being no less than 56 per cent. for three weeks' use for an average of 5·2 hours per day.

The angles at which the various inmates used the various lights were carefully measured, and, in addition, a large number of measurements were made in other houses (usually, of course, to the great amusement of the inmates), and the average angle with the horizontal was found to be rather over 60 deg. Here is a typical case:—The table in a morning-room, used for two meals per day and for writing and reading, is 4 ft. broad and 6 ft. long The room has a pendant immediately above the centre of the table, carrying two large Welsbach lights side by side, at a distance of 6 in. from centre to centre, and 4 ft. 6 in. above the table, measured from the centre of the mantles. The plate, book, or letter is placed, as a rule, 9 in. to 1 ft. from the edge of the table, say 9 in. Assuming that one person sits at each side and each end, the average distance of each person's plate, book, &c., from the centre of the table will be 1 ft. 9 in., and the angle with the horizontal will be over 60 deg.

Taking Lewes' figures for an angle of 60 deg. (2 candles per foot for the Welsbach and 26 for acetylene), and deducting only 30 per cent. for depreciation for the whole life of the mantle, we get 1·4 candles for the former as against 26 for acetylene and 2·07 for the batswing coal-gas burner. It is, therefore, evident that on Professor Lewes's own showing acetylene gives, *at the ordinary working angles*, 13 to 19 times more light than the Welsbach, and that the latter is even surpassed by the flat flame burner.

Burnt with a horizontal flame, as oil-gas is in most railway carriages, acetylene will give out nearly its full candle power on objects placed vertically beneath the light, whereas the mantle in such a situation, gives so little light that it is "unreadable" photometrically.

In conclusion, allow me to state that infinitely more disappointment has been caused in this country by carbide failing to give 5 ft. of gas than has been caused by the burner or mantle question. This statement will be confirmed by practically every generator maker in England. No carbide has up to the present been manufactured in Great Britain on a commercial scale for any reasonable period of time yielding 5 ft. per lb.; a carbide yielding 4·8 ft. in a good generator is a first-rate carbide, and you have to "see that you get it." The public should therefore not be led to believe that they will get 5 ft.

CHAS. BINGHAM.

THE PROPOSED NEW LAW COURTS FOR LEEDS.—The Property Committee of the Leeds Corporation recently had under consideration the dilapidated condition of the corridors on the ground floor of the Town Hall, and decided to obtain designs and estimates for mosaic flooring and faïence work for the walls and ceilings. Tenders and designs were submitted to the Committee on the 17th inst., the figures varying from 3,000*l.* to 9,500*l.* Since the subject was first introduced to the Committee, however, the question of the erection of new Law Courts for the city has come more prominently to the front, and the Committee resolved to defer consideration of the matter pending a decision with regard to the Law Courts. The report by Mr. Boston (the Chairman) and Mr. Beaumont with reference to the Law Courts was adopted. These gentlemen, it may be recollected, reported as to the provision of Law Courts at Manchester, Liverpool, Birmingham, and Sheffield, and the special sub-committee appointed to deal with the question will visit the first three cities named and Cardiff, and will then present a further report.—*Leeds Mercury.*

HEATING OF BUSINESS PREMISES, DUBLIN.—Messrs. John King, Limited, engineers, Liverpool, are carrying out the heating, by means of their improved hot-water heating apparatus, of the Dublin premises of the Limerick Clothing Factory, Limited.

Illustrations.

COMPETITION DESIGN FOR OLD BAILEY SESSIONS HOUSE.

We give this week the exterior and an interior perspective view, and the two principal plans of Mr. Brydon's fine design submitted in competition for the Old Bailey Sessions House.

We have already given our own comments on all the designs. It is only necessary to add here that the design was prepared in conjunction with Mr. J. S. Gibson, though it was necessarily sent in to the Corporation in Mr. Brydon's name. Had it been successful it would have been carried out by Mr. Brydon and Mr. Gibson as joint architects.

A HOUSE BY THE SEA.

THIS house of the bungalow type was designed for a particular site on the coast, and it is intended, alike in plan, treatment of the elevations, and choice of materials, to express a certain seaside character which would be entirely out of place in an inland site.

A special feature is the spacious loggia overlooking the sea, sheltered by the overhanging upper story. Up to the first floor level the whole of the exterior is of local stone in roughly-hewn blocks with a distinct batter, whilst extra protection from the weather is afforded by the unbroken surfaces of green weather slating above. The roofs, of low pitch, are also covered with green slates, and the feeling of strength and repose is enhanced by the long horizontal lines. In the front, the garden slopes down to the sea, being finished by a sea-wall architecturally treated. The architect is Mr. Arthur Stratton, A.R.I.B.A., of Liverpool and London.

The drawing was exhibited at the Royal Academy.

Books.

Reliques of Old London Suburbs North of the Thames. Drawn by T. R. WAY, with an Introduction and Description by H. B. WHEATLEY, F.S.A. London: G. Bell & Sons.

Reliques of Old London on the Banks of the Thames. Drawn by T. R. WAY, with an Introduction and Descriptions by H. B. WHEATLEY, F.S.A. London: G. Bell & Sons.

THESE two very pretty and interesting volumes form practically part of a series of which we have previously noticed one or two others; though not nominally a series, they are all of the same size and got up and bound in the same manner, with what may be called symbolical variations in the design of the binding.

The first-named volume of the two contains sketches from Hampstead and Highgate; Stepney Green; Cheyne-walk, Chelsea; and old houses at Hammersmith and Chiswick. The plates are drawn in lithographic chalk, a style of execution which is not the best for doing justice to architecture, but which suits the object of these plates, which evidently is to give a general impression of the picturesque effect of the scene as a whole, not the detail of the buildings. From an architect's point of view, in fact, they are too sketchy and wanting in precision, but they show a good deal of artistic effect and feeling.

The second volume contains sketches mainly on the lower Thames, including a good many drawings of bridges and waterside scenes; also some of the old houses in the neighbourhood of the Thames, including that charming one in Putney High-street which has now been swept away with so many other interesting relics of the kind.

Mr. Wheatley has added to each sketch a short history and description of the building or locality illustrated. His knowledge of London topography gives a value to these as records. The books form a picturesque and interesting memorial of many old London sites and buildings; and their printing and general make-up is all that could be desired.

The Book of Glasgow Cathedral. With History and Description. Edited by GEORGE EYRE-TODD. Glasgow: Morrison Bros.

THIS is a book of essays by different writers, collected into a kind of memorial volume of Glasgow Cathedral. The principal contributors are Archbishop Eyre, Dr. T. F. S. Gordon, Dr. McAdam Muir, Mr. John Honeyman, Mr. James Paton, Mr. A. H. Millar, F.S.A. Scot., and Mr. Stephen Adam, F.S.A. Scot.

In the main the book is rather a history of circumstances and events connected with the cathedral than of the cathedral itself; but Mr. Honeyman's chapter of course is a completely architectural study, and it is almost needless to say that it is very well done. He makes an interesting comparison between Glasgow and Jedburgh, showing the probability that the same architect was employed on both, and that Jedburgh may be taken as throwing light on Glasgow. Mr. Honeyman does not accept the theory that mediæval churches designed themselves; he says, "We may fairly assume that there was such a servant of the Church as a diocesan architect in the olden time, and there is plenty of evidence to show that his practice was vastly larger, and his opportunities of doing great and original work more numerous, than those of the diocesan architect of the present day."

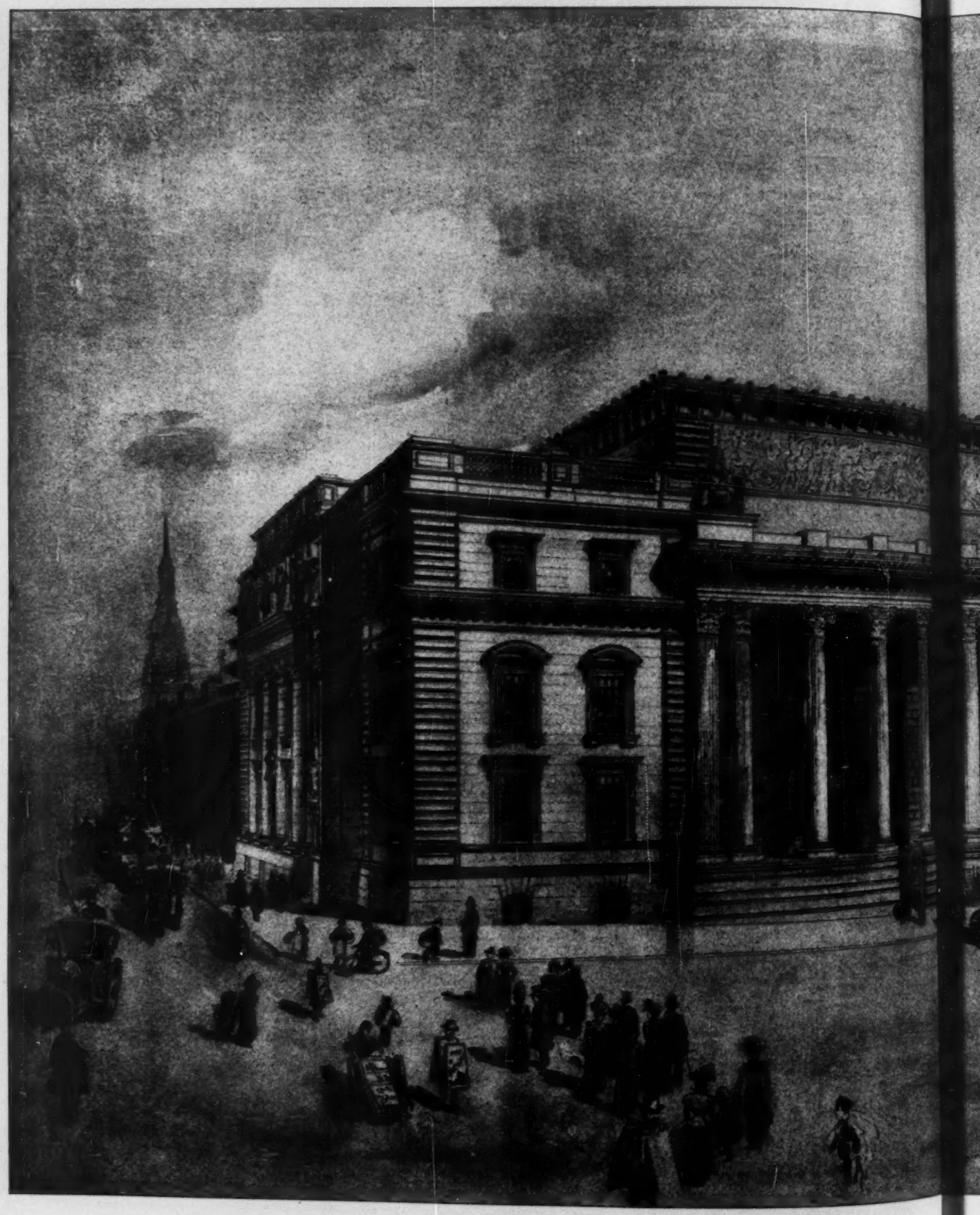
It is not surprising that comparisons should have been made between the east ends of Durham and Glasgow, but Mr. Honeyman points out that, though both show the peculiarity of having several altars in juxtaposition along the east wall, the chapels at Durham are not an integral part of the choir. He says:—

"There is a much more obvious analogy between the east end of Glasgow Cathedral and the corresponding portions of our large Norman choirs, such as Gloucester and Norwich, where the side aisles have been carried round the apsidal ends, with chapels beyond. The Glasgow plan is simply an adaptation of this arrangement to a square end; and in the lower church, where the chapels are separated by stone walls, the arrangement may be regarded as practically identical. There is no other example of this kind in any of our cathedrals. In Scotland we have no Norman choirs with apsidal ends, nor any remains which would lead us to suppose that such choirs at any time existed. At Jedburgh, an important example, where much of the Norman work remains, the choir may have had an apsidal termination, but the aisles certainly stopped short, and the same may be said of Glasgow. The truth is that, as already mentioned, we built no cathedrals in Scotland till the first quarter of the twelfth century, when the Norman style of architecture was on the verge of merging in the Transitional, after which apsidal terminations became uncommon, even in England."

It is a curious point in the design of the cathedral, noted by Mr. Honeyman, that an effort seems to have been made to keep the details homogeneous in character, in a manner seldom if ever met with in English Gothic. The best illustration of this, he observes, is to be found in the chapter-house. "Here we have the same base as that of the choir, and the same windows — narrow lancets with clustered shafts in the jambs and between the two lights—a perfect thirteenth-century elevation, and yet there can be little doubt that this building as it now stands was not completed till the fifteenth century." This is one of the surprises which Scottish Gothic has in store for the architectural student. Another is found in the fact that "about the time that this apparently thirteenth-century chapter-house was being built here, the Perpendicular style was fully developed in England; but there is hardly a trace of Perpendicular work in Glasgow": another instance of the manner in which political demarcations affect architecture. Evidently English Gothic found a difficulty in crossing the border.

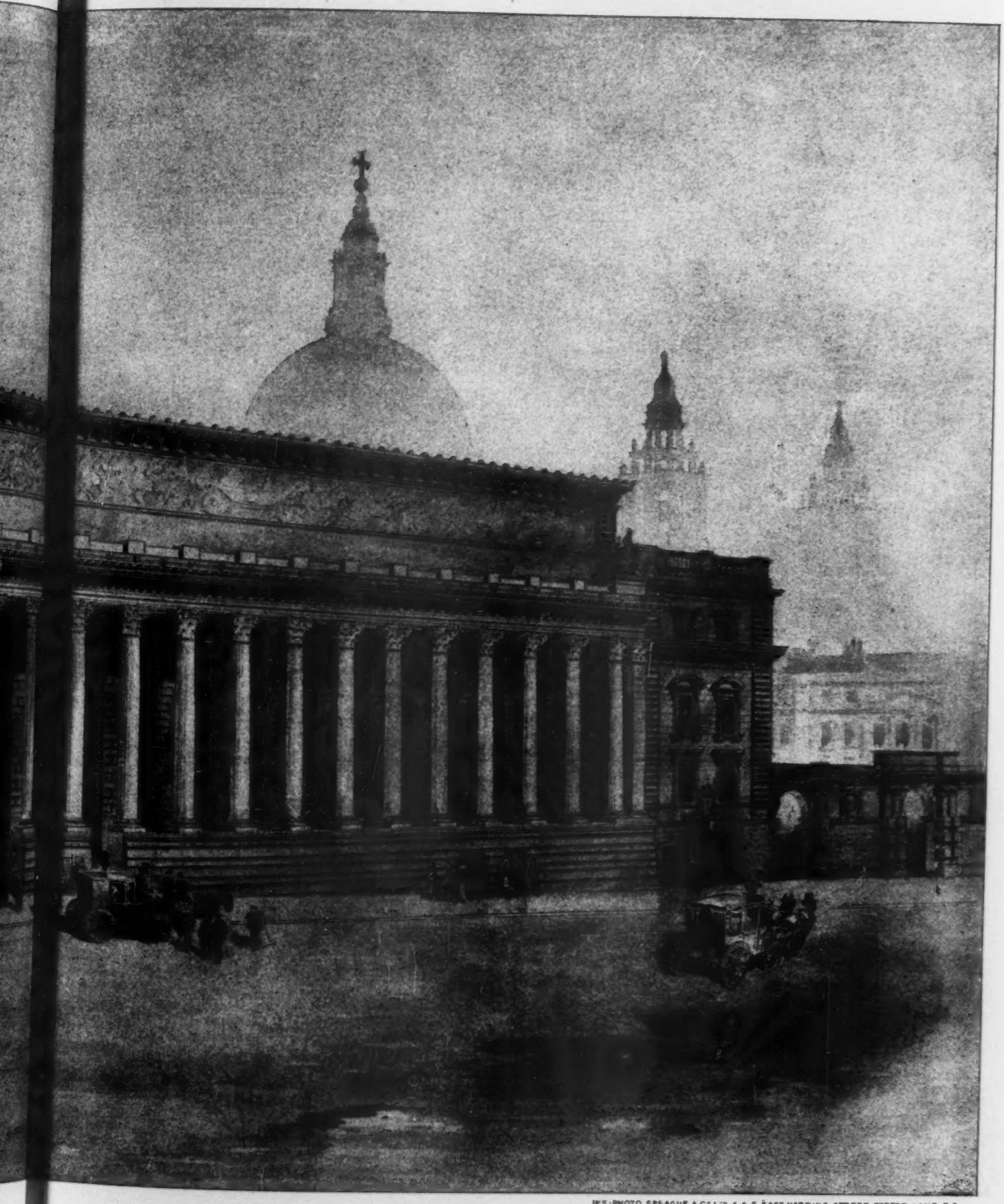
Mr. Honeyman regrets that the beauty of the interior should be so seriously marred by its adaptation to the requirements of a large Presbyterian congregation. It would hardly be expected that a congregation of this persuasion could be adequately provided for in a mediæval church without some clashing with the architectural *genius loci*. Mr. Honeyman suggests that the congregation should rather occupy the nave, "where the introduction of chairs might be tolerated," and that all benches and chairs might be swept away out of the choir aisles. Architecturally speaking, we are of course entirely in sympathy with his wish. But if the modern Presbyterians are permitted to worship in the mediæval church, we do not know that they can be blamed for fitting it up in the manner best suited to their own religious service. The building, after all, is for the religion, and not the religion for the building.

Archbishop Eyre's chapter on the two



OLD BAILEY SESSIONS HOUSE COMPETITION.—D...

PERSPECTIVE V...



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TITION.—DESIGN SUBMITTED BY MR. J. M. BRYDON, F.R.I.B.A.
SPECT... VIEW.

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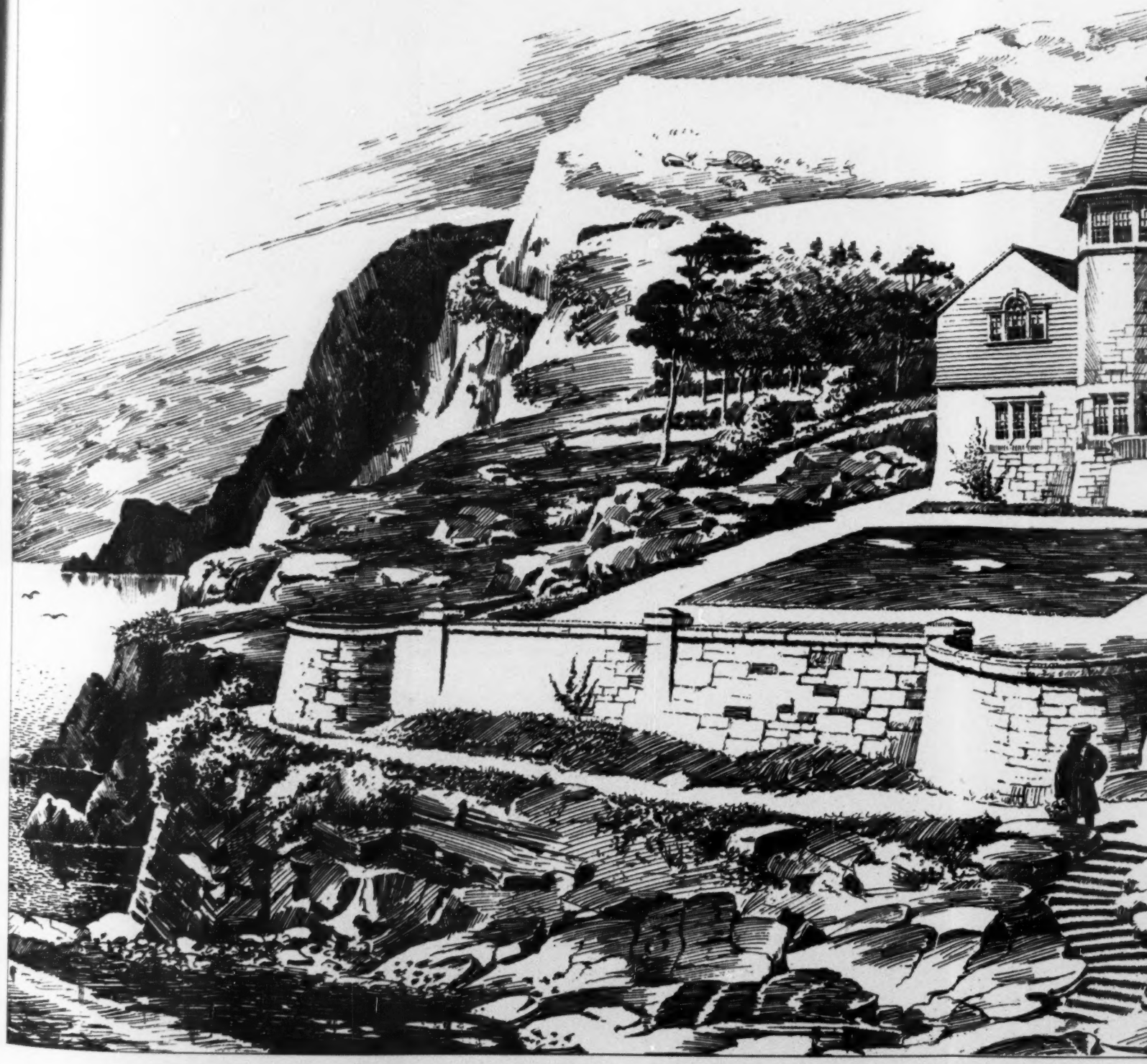
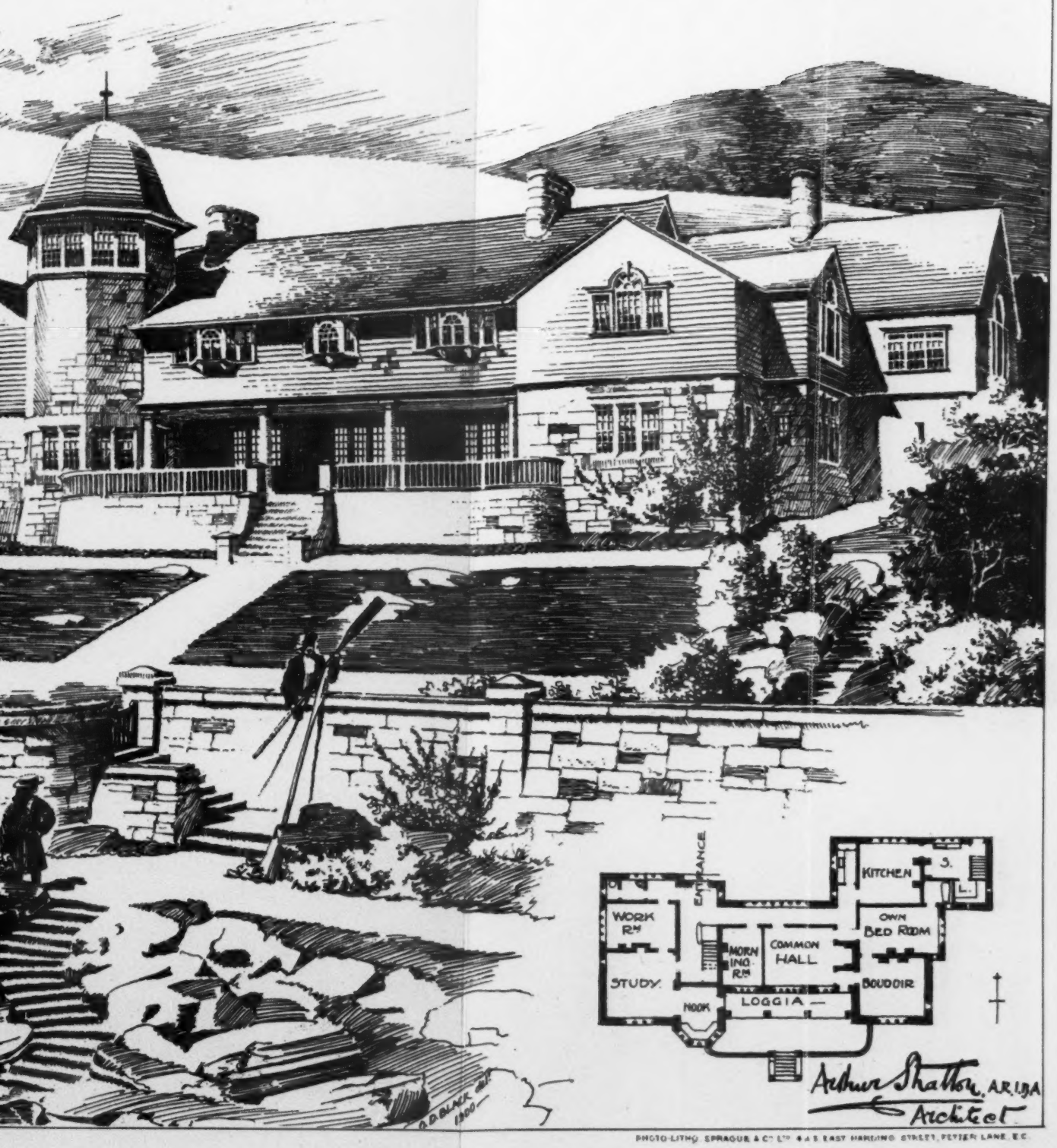
OLD BAILEY SESSIONS HOUSE COMPETITION.—Design submitted by Mr. J. M. Brydon, F.R.I.B.A

INTERIOR OF PUBLIC HALL.

A HOUSE BY THE SEA





Arthur Shatton, A.R.I.B.A
Architect

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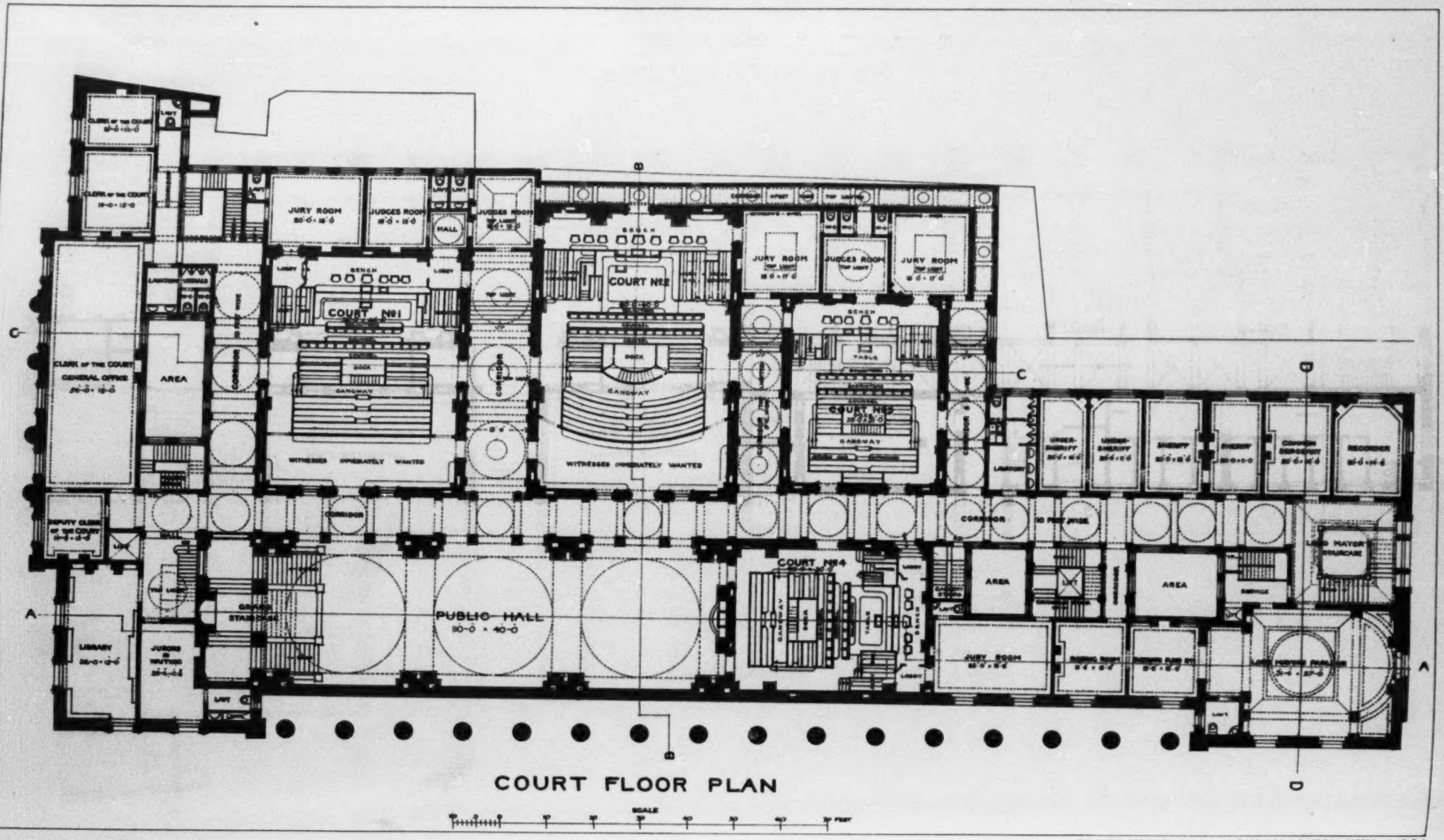

COURT FLOOR PLAN

SCALE

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OLD BAILEY SESSIONS HOUSE COMPETITION.—Design submitted by Mr J. M Brydon, F R I B A

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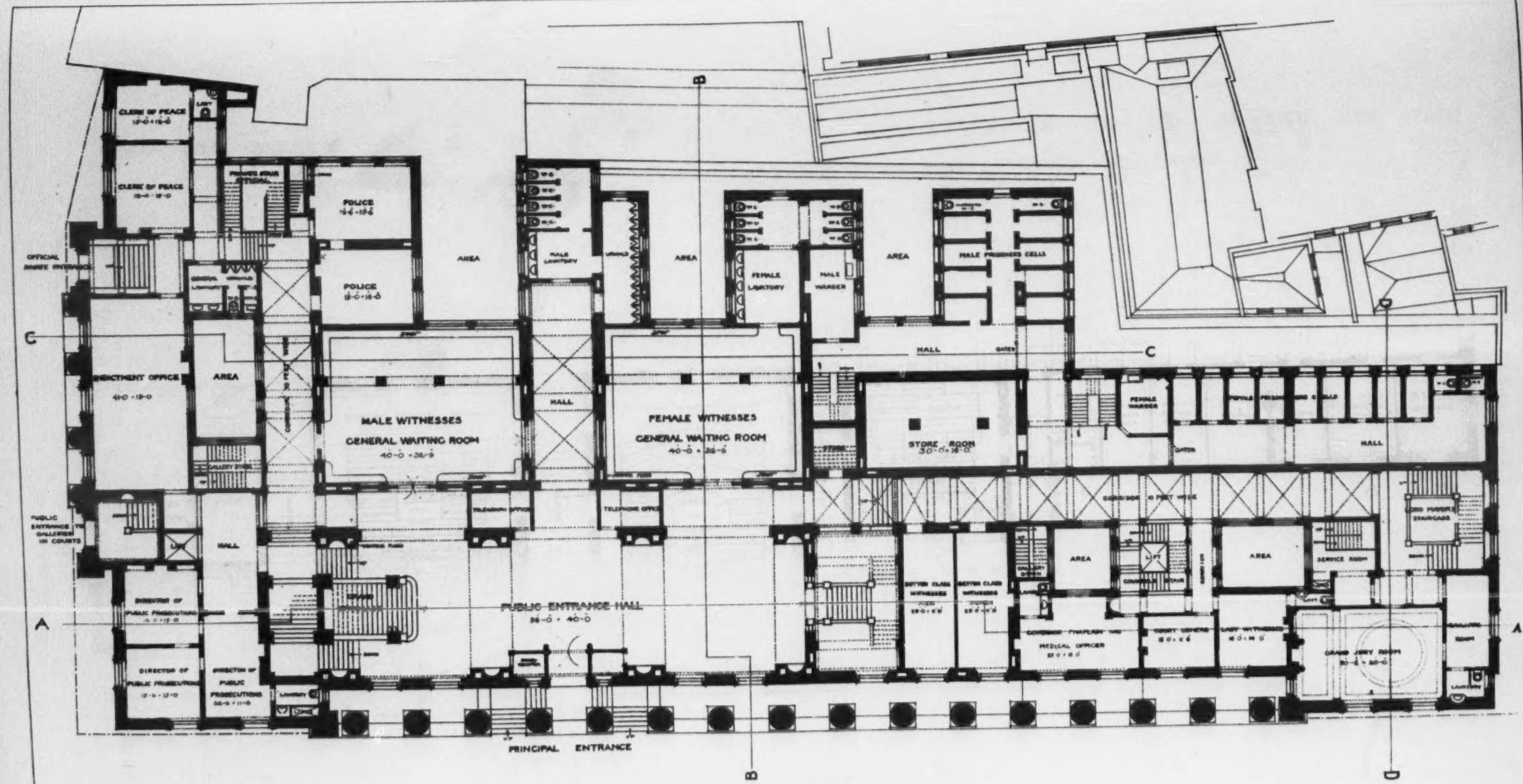

GROUND FLOOR PLAN

SCALE

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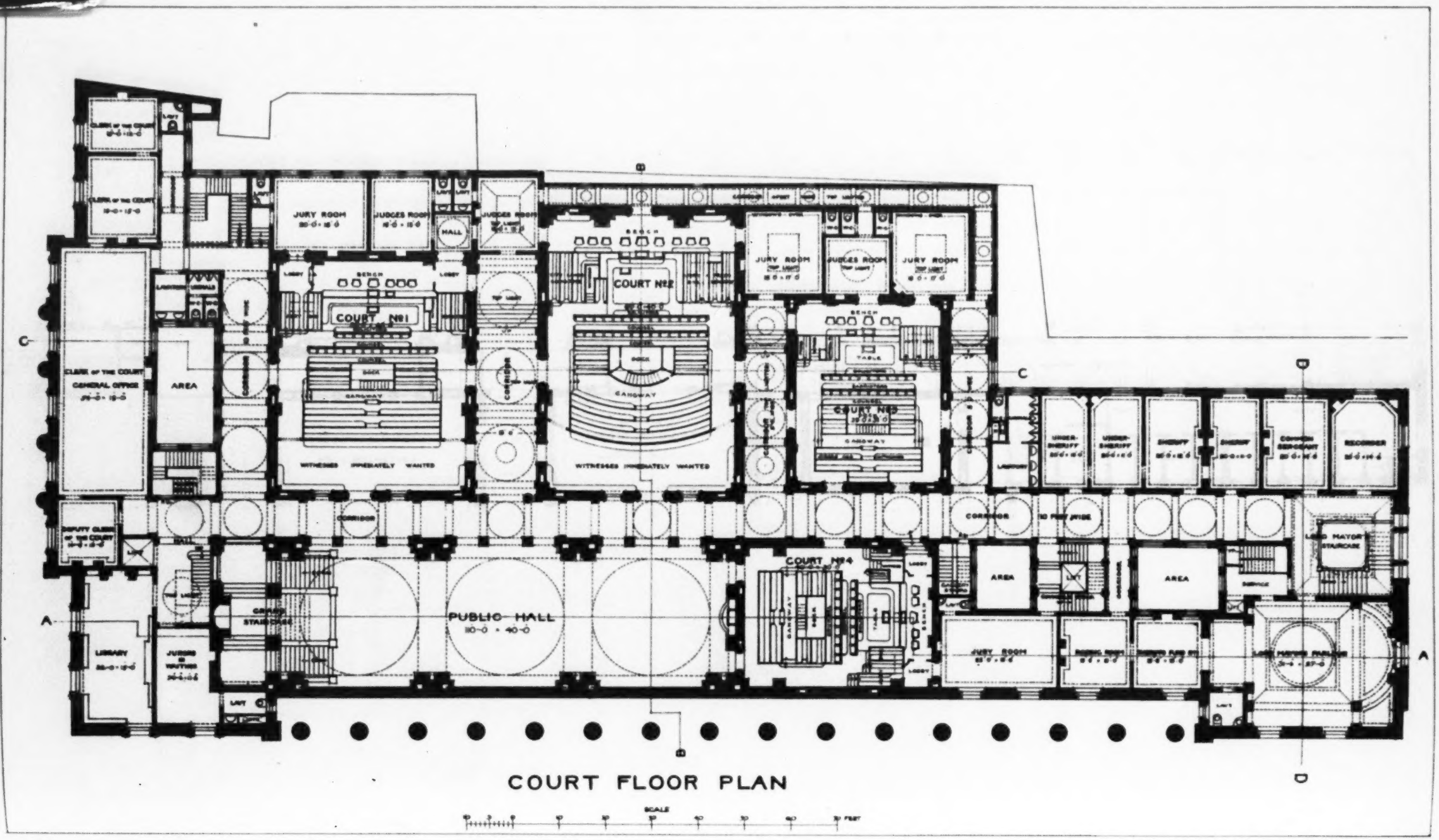

COURT FLOOR PLAN

SCALE

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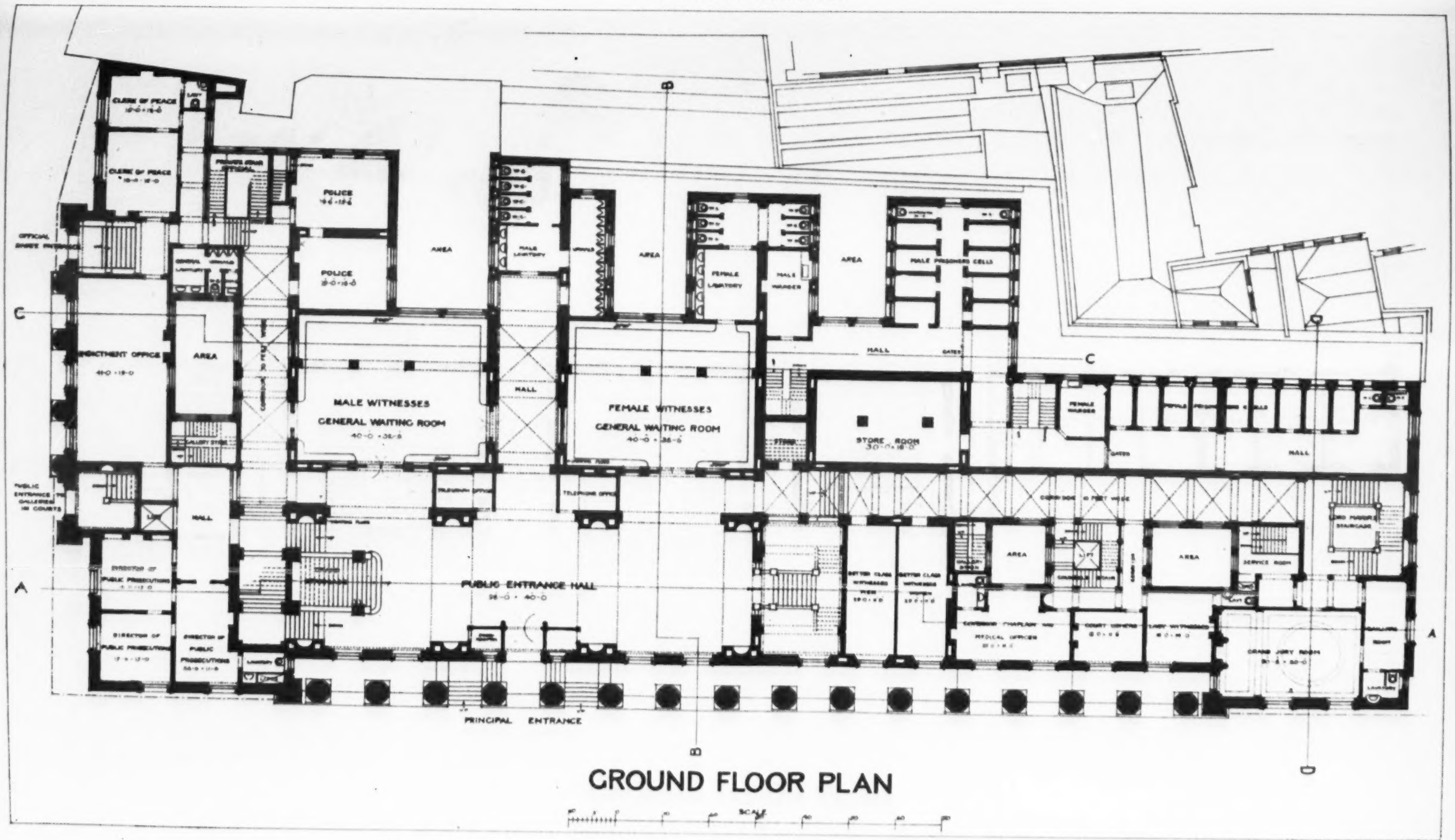
OLD BAILEY SESSIONS HOUSE COMPETITION.—Design submitted by Mr. J. M. Brydon, F.R.I.B.A.

THE BUILDER, AUGUST 25, 1900.

OLD BAILEY SESSIONS HOUSE COMPETITION.—Design submitted by Mr. J. M. Brydon, F.R.I.B.A.



GROUND FLOOR PLAN

SCALE

OLD BAILEY SESSIONS HOUSE COMPETITION.—Design submitted by Mr. J. M. Brydon, F.R.I.B.A.

western towers, which have now disappeared, and his account of their demolition (within the present century) and the alleged reasons for it, is of considerable interest.

Though not primarily an architect's book, the volume is a handsome memorial of the history of a remarkable building.

The Life of Sir James Nicholas Douglass, F.R.S. By THOMAS WILLIAMS. London: Longmans, Green, & Co. 1900.

IN these days of lengthy two-volume biographies it is a relief to meet with a book so remarkable for its brevity and unpretentious character as this short biography of an eminent engineer, "by one who for more than thirty years had the privilege of serving under him." In a literary sense, it is true, the book is not well written, but it makes amends for that shortcoming by its sincerity of tone and by the author's intimate acquaintance with his subject; it is just such a biography as suits with the simple-minded and practical character of the man who is the subject of it.

Sir James Douglass, who was for a long time engineer-in-chief to the Trinity House, and whose name will always be remembered as the engineer of the present Eddystone Lighthouse, was remarkable not only as a bold and capable engineer but as a man of great natural force of character. In the often dangerous work on which he was employed he was ready not only to go everywhere where the workmen were expected to go, but in fact led the way in circumstances of danger, and when working on the Smalls Lighthouse always accompanied the working party to the rock, where both landing and embarking were often dangerous, and was always the first to land and the last to leave, seeing his men safe in the boats before he followed; indeed, on some occasions when the state of the sea rendered the embarking more risky than usual, he would have the boat cast off when his crew were safe in, and swim to it himself. It is easy to imagine, without the evidence given in the book, how his subordinates admired an engineer of this pattern.

"No task that could advance the work that he had in hand did he deem beneath his notice or lowering to his personal dignity. By boldly taking this path, he struck a deathblow at the preposterous idea of many of his workmen, who thought their caste in danger if they did any but the one task they were pleased to call their own peculiar trade. Sir James, *by example*, soon convinced his men that the fact of a man being a good stonemason did not render him unfit to lend a helping hand to a smith or carpenter; there was a task to be done, and he and they were the men who had to do it; so his mechanics, good as they were in their own selected branches of work, soon, under his teaching, learned to be a help to the sailors of the tug and tender employed on the work, and as boatmen they were one and all hard to match and harder to beat. In all things he, the master-spirit, was better than the best man there."

This is refreshing reading, in these days when too many working men seem to find their greatest pride in skirking as much work as they can. Perhaps if there were more Douglass's there would be fewer strikes and fewer disputes as to who ought to do this or that bit of necessary work; men would be shamed out of it.

The book brings vividly before us the difficulties and dangers of lighthouse work on an exposed reef. At the Smalls lighthouse (eighteen miles off Milford Haven), when getting in the foundations, each man was compelled to wear a lifebelt at his work; and eyebolts, with ropes attached, had to be fixed in the rock as holdfasts for them, in the event of the sea suddenly rushing upon them; and the surf often rose so rapidly around the rock that the landing boats could not approach sufficiently near to take off the men, who had then to jump into the seething water, with ropes fastened to their waists, and be hauled to the boats by the crews. It was under circumstances of this kind that the engineer showed his readiness to rough it with the men, and even to face more than they were ready to face. The same trait, it is pleasant to note, is recorded also of Smeaton, his predecessor on the Eddystone rock.

The Wolf, the Basses, and the Longships lighthouses were all carried out under the personal supervision of Mr. Douglass, who was also responsible for the lighthouse at Great Castle Head, Hurst, Lowestoft, Hartland Point, St. Tudwal, and Ball Point; besides a good many smaller coast works of different kinds.

It was Douglass himself who, in 1887, announced at the Mechanical Section of the British Association that Smeaton's celebrated work at Eddystone was doomed, in consequence of the rock having been undermined by the sea. It was proposed in some quarters that the Eddystone rock should be blown up; but it was proved that this operation, if successful, must cost seven times as much as the erection of a new lighthouse, and there was also the important consideration that the lighthouse was very valuable as a guide to shipping in regard to their whereabouts. It is noticeable that in designing the new structure Douglass departed from Smeaton's model with the widely spreading base, the object of which was to divert the blow of the waves upwards, and adopted a nearly vertical section. He maintained that it was better to let the blow of the wave expend itself in rushing round the base, where the weight and stability of the structure were greatest, than to lead it up the walls to the higher part of the stalk; and in fact it has been stated elsewhere that the sea struck with such force against the underside of the projecting cornice of Smeaton's lighthouse that the men in it could actually feel the upward blow which seemed to lift it. Some details as to the structure of the new lighthouse are given. The tower is solid, except for a water tank, for 25½ ft. above high water spring tides. Where the rooms commence the walls are 8 ft. 6 in. thick, diminishing to 2 ft. 3 in. at the top. The masonry was all prepared and fitted on shore, and the blocks sent out to the rock finished and numbered. The method of joining the masonry consists in having a raised dovetailed band 3 in. high on the top bed and on one end joint of each stone (the material is granite). A corresponding dovetailed recess was cut in the bottom bed and end joint of the adjoining stones, with just sufficient clearance for the raised band to enter it freely in setting. The work when thus jointed and set in Portland cement, becomes almost like a solid piece of granite. It was on the completion of this work that Douglass was knighted.

For other information about the man and his works we must refer the reader to Mr. Williams's book, which is an interesting memoir of a remarkable man, who did some very remarkable work.

Acetylene: A Handbook for the Student and Manufacturer. By VIVIAN B. LEWES, F.I.C., &c. London: Archibald Constable & Co., Limited. 1900. Price 31s. 6d. net.

THIS is the most important and exhaustive book devoted to acetylene which has yet been published, and its contents clearly demonstrate that scientific men of all nationalities have been keenly attracted by the wide field of research opened by the discovery that by mere fusion of a mixture of lime and coke in an electric furnace a carbide may be manufactured which requires only contact with water to cause rapid generation of that most brilliant of gaseous illuminants—the simple hydro-carbon, acetylene. Six years ago calcium carbide and acetylene were laboratory curiosities familiar only to some few score chemists, whereas today it is being manufactured in Europe and America at a rate of many thousands of tons per annum; while acetylene is utilised for illuminating purposes in every quarter of the globe, and, employed as a searchlight, has repeatedly shed its brilliant rays over South African battlefields.

The book contains 228 illustrations, and is divided into three portions: Part I., scientific, is devoted to the scientific study of acetylene; Part II., technical, deals with the technical developments of the acetylene industry during the last few years; and Part III., includes the legal enactments in force in various countries concerning the use of acetylene, and gives a list of the patents relating to acetylene or carbide taken out in this country, with a short précis of their contents. The different fire insurance regulations, which are of particular interest to many of our readers, will be found indexed under "Legal Enactments." A feature uncommon in a book of this description is the introduction of marginal references in red letters, which greatly facilitate reference to any particular subject.

Professor Lewes has given careful attention to the work which has been done throughout Europe and America, and has woven the facts deduced from his own researches with those discovered by his numerous coadjutors into a connected history of acetylene from the date of its discovery in the year 1836 to the present time.

Although Professor Lewes has retained that popular style which is found in his earlier works, and for which his lectures are celebrated, he has contrived to combine with this an attention to detail and an accuracy of description which redeems the book from the superficiality so common in English popular books of science. We have no hesitation in commending the book to any one requiring information of any description regarding acetylene or calcium carbide.

Surveying with the Tacheometer. By NEIL KENNEDY, M.Inst.C.E. London: Crosby Lockwood & Son. 1900.

DURING the early part of the past century considerable attention was given by the well-known Italian engineer, Porro, to the improvement of methods of preparing preliminary surveys, and at a later period his work was systematised by the French engineer Moinot. As a result of their labours the instrument now known as the tacheometer was evolved. Briefly described, this is a transit theodolite having a large achromatic telescope, with stadia hairs in the diaphragm, and an annalatic lens. The last-named detail has been the chief means of rendering telescopic measurements practicable to the surveyor. Although largely adopted on the Continent and in the United States, very little use is made of the tacheometer by engineers, and practically none by land surveyors, in this country. Whilst particularly advantageous in many respects, tacheometric surveying is not popular, partly because the instrument is usually made with the graduation of 400 divisions instead of 360 deg. to the circle, and partly for the reason that some little trouble is involved in calculations for reducing inclined to horizontal distances in distance measuring, and for corrections of a similar nature in levelling.

The object of the book to which we refer is to explain the general principles upon which the system of tacheometric surveying is based, and to give an adequate idea of the manner of applying them in practice. Mr. Kennedy addresses civil and military engineers and surveyors, and it is consequently not necessary that he should discuss matters already known to his readers. His attention is strictly confined to the subject selected, and although the book in question is by no means diffuse, the aim of the author is admirably realised. After briefly describing the essential features of the instrument, Mr. Kennedy defines the six permanent adjustments of the tacheometer and the order in which they should be executed. The two following sections are devoted to "Measurements of heights and distances by means of the tacheometer and staff" and to "The staff." For the simplification of work it is recommended that the staff should be marked with divisions, each equivalent to a unit of linear measurement multiplied by the "constant" of the instrument. Then, the number of these special divisions observed gives at once the distance between the staff and the apex of the measuring angle, which coincides with the main axis of the instrument. Simple rules are given for computing the horizontal distance between the instrument and the staff when the line of sight is at an angle, and some other necessary points are also considered. "Field work," "office work" and "other methods of tacheometry" are succinctly dealt with, and the remaining part of the book consists of appendices; the first being a sample of field book; the second and third are tables for reducing distances and heights, with ordinary and centesimal degrees; and the fourth is a table for reducing centesimal to sexagesimal graduations and vice-versâ. Some useful diagrams are given at the end of the volume, one of which includes Gillman's patent diagram for the reduction of tacheometer readings. This diagram is fully explained in the section dealing with office work.

BOOKS RECEIVED.

UNIVERSAL DIRECTORY OF RAILWAY OFFICIALS, 1900. Compiled by S. Richardson Blundstone. (The Directory Publishing Company, Limited, Catherine-street, Strand.)

FREEHAND DRAWING OF ORNAMENT. By John Carroll. (Burns & Oates, Limited.)

TRADE CATALOGUES.

Messrs. A. Ransome & Co. send us their catalogue of wood-working machinery exhibited at the Paris Exhibition, of which we may have more to say on another occasion. The catalogue includes description and illustration of their steam tree-feller; cross-cut saw for logs for saw-mill work; saw benches; ripping and cross-cutting bench; band saw machines: high speed moulding machines; planing, thicknessing and mortising machines; cask-making machinery; and pneumatic conductor for wood refuse, which last is a most useful and economic addition to a wood-working factory, preventing the accumulation of sawdust and chips, and disposing of them automatically. The catalogue is very well got up and illustrated.

Messrs. Heal & Son send us a series of illustrations of their guest room at the Paris Exhibition, or rather of the furniture contained in it, which can hardly be praised too highly; in point of good taste in fact there is not a fault to be found with it; some people may prefer a style of furniture less simple and square in line, but for furniture in a quiet unpretentious style it is admirable, and a firm who promote this kind of work are assisting in raising the taste of the public.

The Ashton and Green Iron Company send us their catalogue, divided into five sections. Section I. includes mantels and grates; Section II. cooking ranges, boilers, complete cooking apparatus for a hotel; Section III. includes baths, urinals, pedestal and valve closets, cast-iron lavatory frames (these latter would be much better without so much so-called ornament, but that is the common mistake in cast-iron work), cattle-troughs, tanks, steel mangers, &c.; Section IV. deals with stable and harness-room fittings, wrought-iron hurdles and gates, boilers and heating apparatus for public buildings, schools, private houses, and conservatories; and Section V. with door furniture, locks, window fittings, electric-bell fittings, &c., and also shows illustrations of their panic "exodus" door, for folding or swing doors for public buildings, to open with a push from inside. The whole catalogue includes an immense variety of work connected with practical ironmongery on a wholesale scale.

The British Luxfer Prism Syndicate send a new catalogue of their window and pavement prisms and diamond tiled lights.

Messrs. Steel & Garland send us their illustrated catalogue of artistic cast-iron mantels and grates, most of which are in excellent taste, and merit the adjective applied to them. They show also some antique copper repoussé mantels and fireplaces, which are very good.

Messrs. Dickinson & Co. send us specimens of their featherweight laid and wove book papers, an excellent style and surface of paper, described in very artistic type and setting.

Messrs. Sissons Bros. & Co. send us a pamphlet describing their "Hall's Sanitary Washable Distemper," made in sixty tints (some specimens of which are given). They claim for it that it sets hard, contains no lead, and does not turn black, and only requires the addition of water to render it ready for use, so that it can be used by any one.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

7. Alternating Current. Alternators. Frequency. Effective Volts and Amperes. Power Factor. Alternating and Direct Relative Advantages.

IN a direct current dynamo the current generated in any coil of the armature flows in one direction round that coil for half a revolution, and in the other direction for the other half revolution. In order to get the current to flow always in the same direction in the external circuit an elaborate and costly device called a commutator is employed. The current is conveyed to the external circuit through stationary copper or carbon brushes, which press on the commutator. Now if the ends of a coil, instead of being connected to particular segments of the commutator, were simply connected to two metal rings round the spindle of the armature, and insulated from it and from one another, then, if two metal brushes press on these rings, we could get from them an alternating current as the armature revolves. For one-half revolution the first brush would be positive and the second negative, and for the other half revolution their polarities would be reversed. If a dynamo were constructed in this manner, then, during one turn of the armature the current in the external circuit would go through a complete cycle of changes, flowing first in one direction and then in the other, and during the next turn of the armature it would go through exactly the same cycle all over again. The time that an alternating current takes to go through all its values is called the period of the alternating current, and the number of periods in a second is called the frequency of the alternating current. If the armature were making 600 revolutions per minute, *i.e.*, ten per second, then the frequency would be 10. Such a frequency would not be suitable for electric lighting, as the flickering of the light in a glow lamp caused by the varying value of the current would be very unpleasant. If, however, the frequency is 40 or 50, then the light is apparently absolutely steady, and quite as suitable for illuminating purposes as that produced by direct current.

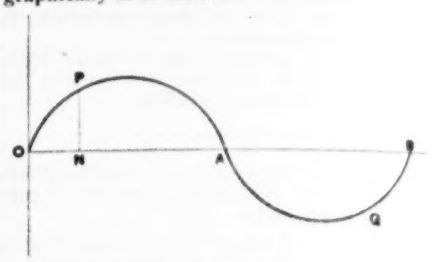
In our hypothetical alternator, in order to get a frequency of 50, we should have to rotate the armature fifty times per second or 3,000 times per minute. Whilst it is easy to do this mechanically with small armatures, yet with large armatures it would be practically impossible owing to the enormous centrifugal forces called into play tending to burst the armature. Hence in practically alternating current dynamos we have several pairs of field magnets in order to make the current alternate several times in one revolution.

Practical alternators can be divided into three classes. In the first class are those in which the armature revolves and the field magnets are stationary. In the second class the field magnets are rotated, whilst the armature is stationary. In the third class the alternators are called inductor alternators. In this class both the field magnets and the armature windings are stationary, the revolving part consisting of iron pieces which make and break in succession certain magnetic circuits connecting the armature coils with the field magnet coils, thus inducing alternating currents in the armature coils.

The field magnets of alternators are usually excited by a small auxiliary direct current dynamo. In the first class the terminals of the armature are connected to two collecting rings on the shaft, and the current is collected by metal brushes. In the second class the ends of the armature are simply connected to two terminals, and the coils round the rotating field magnets are excited by direct current passed to them by collecting rings on the shaft. In the third class no collecting rings are required, the direction of the magnetic flux in the armature coils being alternated by the pieces of iron making a magnetic circuit first with a positive pole of the field magnets, then with a negative pole, and so on.

The frequency of the alternating currents used in this country is a very variable quantity. Out of ninety alternating current supply stations twenty-five use a frequency of 50, twenty-four use one of 100, and the rest use frequencies varying from 40 up to 125. One would naturally think that it must make practically no difference what frequency you employ, seeing that British engineers have chosen their frequencies merely to suit the speed of their engines, &c. On the contrary, it is of very great importance. An arc lamp, for example, that will work well when the frequency is 100, will not work at all at a frequency of 50. In the same way a motor that will work when the frequency is 50 will not work in a circuit where the frequency is 100. In 1899 a committee of the Institution of Electrical Engineers unanimously recommended that a frequency of 50 was on the whole the best suited for alternating currents for glow lamp and power supply. For the transmission of power to long distances a frequency of 25 was recommended. It seems highly probable that 50 will become the standard, and so the grievances of manufacturers who have had to stock alternating current apparatus to suit the different frequencies in use all over the country will be removed.

We can represent an alternating current graphically as follows:—



Let (fig. 1), the time in fractions of a second, be measured horizontally, and the value of the current in amperes be measured vertically. Thus P N represents the current at the time O N. O A is half the period of the alternating current, and O B is the whole period. The locus of P is a curve which is called the wave of the current, and the shape of this wave is of great importance. O P A is the positive half of the wave, and A Q B is the negative half. At the time O B the current begins to go through its values all over again.

If the external circuit be non-indicative, *i.e.*, if the lines of force round the wire that grow with the current, and are inseparably linked to it, do not cut the wire, an action which would create an electric pressure tending to hinder the growth of the current, then the alternating pressure at the brushes is exactly in step with the current, vanishing when the current vanishes and attaining its maximum value when the current is a maximum. The shape of the wave of electric pressure would thus be a curve similar to the current curve in fig. 1.

In this case, if R be the resistance of the external circuit, c the instantaneous value of the current, and e the instantaneous value of the pressure between the brushes, then, by Ohm's law,

$$c = \frac{e}{R} \quad \text{- - - - - - (1)}$$

Also by Joules' law the power expended in the external circuit at this instant is c^2R or from (1) $c\,e$ watts. Now as c and e both go through a cycle of changes during a period the power expended in the external circuit is a continually varying quantity. What we want to know in practice is the mean rate of working during a period. Hence we want to find the mean value of c^2R for a period. Now the deflection on an alternating current ammeter measures the mean value of c^2, and if the reading be C, then c is the square root of the mean square of c. Hence the mean watts expended on the circuit is C^2R where C is the reading of the current on an alternating current ammeter. C is called the effective value of the current. Similarly if E be the reading on a voltmeter across the brushes then E is the effective value of e, or in mathematical language it is the square root of the mean square of e. Suppose, for example, that the pressure was 5 volts for the thousandth part of a second, 7 volts for the next thousandth part, then 13, 13, 7, and 5 for further thousandths respectively, then if E were the reading on the voltmeter

$$E^2 = \frac{5^2+7^2+13^2+13^2+7^2+5^2}{6} = 81$$

therefore the effective volts, *i.e.*, the reading on the voltmeter would be 9.

In the case of the non-inductive circuit, then, we have $E = CR$, and the power $= C^2R = CE$ where C and E are the ammeter and voltmeter readings respectively, exactly as in direct current circuits. In this case the current and the pressure are said to be in phase with one another. In general, however, alternating current circuits are inductive. The lines of force linked with the current are continually cutting and recutting the circuit, thus setting up an alternating pressure in it. In addition these lines of force may cut neighbouring circuits, setting up currents in them which give rise to lines of force which set up an alternating pressure in the original circuit as they cut it when expanding or collapsing. The effect of all this is that the pressure in the original circuit is the resultant of the original pressure and of several others called into play by the lines of force linked with the current. The wave of applied pressure is now no longer in step with the current wave, although, of course, this latter wave must always be in step with the resultant pressure. Hence sometimes the product $c\,e$ is negative, *i.e.*, the circuit is giving back power to the alternator.

It can be proved mathematically that the maximum value of the power expended is CE. It has this value when c and e are in phase with one another. The minimum value is zero, and it has this value when the phase difference between the two is a quarter of a period—*i.e.*, when either the current or the pressure passes through its zero value a quarter of a period after the other. Merely knowing the ammeter and voltmeter reading in an alternating current circuit only tells us the maximum possible value of the power being expended. For example, in a certain transformer circuit the current was 1·194 amperes and the pressure 2,400 volts. The maximum value of the power in this circuit is $2{,}400 \times 1{\cdot}194$ watts—*i.e.*, 2,866 watts. The actual power taken, however, was only 151 watts. Only six-hundredths of the apparent power was being expended in the circuit. Hence the current must have been flowing against the applied pressure for a considerable fraction of the whole period giving work to the alternator.

Again, if R be the ohmic resistance of an inductive circuit, and e, e^1, and c be the instantaneous values of the applied volts, the volts due to self and mutual induction, &c., and the current in the circuit then by Ohm's law

$$c = \frac{e - e^1}{R}$$

$$\therefore \frac{e}{c} = R + \frac{e^1}{c}$$

Hence $\frac{E}{C}$ is greater than R. It is convenient to give this ratio a name. It is called the impedance of the circuit. We see that the minimum value of the impedance in a circuit is the ohmic resistance of the circuit.

The following laws, then, in alternating current theory are respectively analogous to Ohm's law, Joule's law, and the power equation in direct current theory.

(1) $C = \frac{E}{I}$ where I is the impedance of the circuit.

(2) Power $= C^2R + H$ where H is the energy expended in the neighbourhood of the circuit, in eddy currents, magnetic friction, &c.

(3) Power $= CEf$ where f is defined as the power factor, and may have any value between O and I.

In the particular case when we have only self-induction in the circuit, then H = O and from (2) and (3)

$$f = \frac{CR}{E} = \frac{R}{I} \text{ from (1).}$$

In general, however, f can only be found by means of a wattmeter. If W be the reading on the wattmeter then by (3)

$$f = \frac{W}{CE}$$

Ex. 1.—In a ten kilowatt Ferranti transformer the resistance of the coil to which current is supplied is 6·45 ohms. The current taken by this coil at a particular load was 0·270 amperes and the voltage applied was 2,400. The wattmeter reading showed that 637 watts were being expended on the transformer. The power factor is, therefore, $\frac{637}{2{,}400 \times 6{\cdot}45} = 0{\cdot}98$.

The work expended in heating the coil was only $(0{\cdot}27)^2 6{\cdot}45$, *i.e.*, 0·5 watt. Hence H is 636·5.

Again, the impedance $= \frac{2{,}400}{0{\cdot}27} = 8{,}889$ ohms.

Ex. 2. The voltage across the terminals of an inductive coil (choking coil) in series with an arc lamp is 60, and the current through it is 15 amperes. If it is taking 45 watts, what is its power factor and impedance?

The impedance $= \frac{60}{15} = 4$ ohms. The power factor $= \frac{45}{60 \times 15} = 0{\cdot}05$.

When power has to be transmitted to a distance by means of alternating currents it is necessary for economic working that the power factor of the motors at the receiving station be high. For if W be the watts received at the station, E the voltage, and f the power factor, then the current $C = \frac{W}{Ef}$ and the power expended in heating the mains is $C^2R = \left(\frac{W}{Ef}\right)^2 R$. Hence the smaller f is the greater the power lost in the mains. It is necessary then that alternating current motors have a high power factor.

One of the causes that produce a low power factor is that the pressure and current are out of step with one another, so that the current is flowing against the machine pressure for a fraction of a period and so restores to the dynamo some of the work it gets from it. Another cause is that the shapes of the waves are very different. For example, the power factor of an alternating current arc between two carbons may be as low as 0·7, yet the current and pressure are exactly in step with one another. The reason is that the shapes of the waves are different.

If we put a condenser across the poles of a direct current dynamo there is a momentary rush of current to charge it, and then there is absolutely no current, as the resistance of a condenser is practically infinite. If, however, we put a condenser across the poles of an alternator, then, since the polarity changes some hundred times a second, we get an alternating current in the wires leading to the condenser, and by varying the capacity of the condenser we can make this current of any magnitude we please. It is found that this current is always a quarter of a period in advance in phase of the pressure driving it, and hence the power factor of a condenser circuit is zero. We can produce, in fact, by a condenser a large idle current in a circuit a quarter of a period in advance in place of the applied pressure. Now, induction in a circuit produces a lagging current, and we can arrange by putting a condenser across the terminals of an inductive coil and adjusting its capacity that the idle current of the condenser supplies the necessary idle current of the coil and *vice versâ*. When this is arranged, practically none of the condenser current flows in the mains at all. It simply oscillates backwards and forwards through the inductive coil. By this means the current in the mains can, in many cases, be made very much smaller than the current in the choking coil, and the power factor of the circuit considerably increased. Condensers have been extensively used in electric lighting, especially with alternating current motors, but the results obtained have not been very satisfactory.

The effect of a combined alternating and direct current in a circuit is very instructive. If A be the value of the direct amperes and i the instantaneous value of the alternating current, then the instantaneous value of the combined current is $A + i$. The square of this current $A^2 + 2Ai + i^2$, and hence the mean value of this expression is $A^2 + I^2$ where I^2 is the mean value i^2. The mean value of the term $2Ai$ is zero, for i has as many positive as negative values during a whole period, and the positive and negative values are exactly equal to one another, and hence their sum must be zero. Thus, if we have a direct current A flowing in a main and also an alternating current I, then the ohmic loss due to the heating of the main is $R(A^2 + I^2)$ and not $R(A + I)^2$. In fact, each produces its heating effect exactly as if the other were not there. For example, suppose the resistance of a main to be 1 ohm, and that a direct current of 100 amperes is flowing in it, then the loss in the main is $(100)^2 \cdot 1$, *i.e.*, 10 kilowatts.

If the current were 200 amperes direct or alternating, the loss would be 40 kilowatts. But if the current were 100 amperes direct and 100 amperes alternating, then the loss would be only 20 kilowatts. By combining the two systems we can therefore sometimes diminish the loss in the mains.

The advantages of alternating current supply are that the dynamos necessary are simpler in construction than those for direct current, and the pressure of supply can be easily and economically varied by means of transformers, which we shall describe in our next lesson. The disadvantages are that alternating current motors and arc lamps are not so efficient as direct current ones, and it is a drawback also not to be able to charge small accumulators.

CATHOLIC CHURCH, BIRKENHEAD.—The Catholic church of St. Joseph, Birkenhead, was opened on the 19th inst. The church is situated at the corner of Willow Bank-road and North-road, Devonshire Park, is of red Ruabon brick and terra-cotta, and has seating accommodation for 700 worshippers. It has chancel, two side chapels, nave, and aisles, the two latter being separated by arches supported on marble pillars. There are two sacristies, and the plans provide for a presbytery. Entrance is from North-road, the doorways being at each end of a gallery, over which a choir and organ-loft are to be built. The church has been built by Mr. Peter Rothwell, of Birkenhead, from plans by Mr. Edmund Kirby, of Liverpool.

GENERAL BUILDING NEWS.

PARISH CHURCH, ROWLESTONE, HEREFORDSHIRE.—The parish church of St. Peter, Rowlestone, Pontrilas, was reopened on the 10th inst. after restoration. The work was carried out by Mr. Henry Phillips, of Pandy, under the direction of Mr. G. A. Derrick, architect, of Newport, Mon.

METHODIST CHAPEL, TANFIELD, YORKSHIRE.—The foundation-stones of a new chapel at Tanfield were laid recently. Mr. W. J. Morley, of Bradford, is the architect.

REOPENING OF GLENPROSEN CHURCH, FORFARSHIRE.—On the 12th inst. the church at Glenprosen was reopened after renovation. New pews of pitch-pine have been constructed, a pulpit of carved oak has been placed in position, and stained-glass windows have been inserted. The work was carried out under the directions of Mr. R. S. Lorimer, of Edinburgh.

ST. BARNABAS' CHURCH, CROSLAND MOOR, HUDDERSFIELD.—The foundation-stone of this building was laid recently. The nave is to be six bays in length and will measure 93 ft. by 24 ft., the chancel 37 ft. by 24 ft., and the aisles 37 ft. by 14 ft. East of the south aisle there will be a side chapel 37 ft. by 15 ft., whilst one bay east of the north aisle is to be reserved for the organ. To the east of the north aisle and organ-chamber will be a sacristy, and to the north of it a choir vestry. On the west of each aisle is to be erected a porch with doorways into the aisles and also into the western part of the nave. At present it is proposed to place only a wooden bell cote at the west end of the nave of the church. The church will be built of local stone, the high roofs being covered with tiles and the flat ones with lead. Chairs are to be used for seating accommodation, and the church will be heated by an arrangement of hot-water pipes. Messrs. Graham & Jessop are the contractors for the masonry, slating, and woodwork; Mr. W. E. Jowett for the plastering; Messrs. G. Garton & Son for the plumbing; and Mr. A. Beevers for the painting. Mr. Hodgson Fowler, of Durham, is the architect.

PRESBYTERIAN CHURCH, HOWTH, DUBLIN.—Howth new Presbyterian church has just been opened. The church faces the main Dublin road, adjoining the electric tramway. The architect was Mr. Arthur Young, of Lincoln's Inn-fields, London, and the building has been erected by Mr. Joseph Small, of Malahide. It provides accommodation for about 400 worshippers. There are seats for 300 in the body of the church, seats for the remaining 100 being provided in three small galleries. The pews have been made by Messrs. T. R. Scott & Co., Dublin, and are of pitch-pine. The floor is laid in a herring-bone pattern with oak blocks, carried out by Messrs. Bourke & Co., of Walthamstow. The doors are of teak and pitch-pine, and the heating, by the low-pressure hot-water system, has been carried out by Mr. William Baird.

WESLEYAN CHAPEL, SOUNDWELL, GLOUCESTERSHIRE.—Soundwell Wesleyan Chapel was reopened recently after undergoing renovation. Mr. J. H. La Trobe was the architect, and Mr. E. S. Bennett the builder.

RESTORATION OF CHILCOMPTON CHURCH, SOMERSETSHIRE.—The parish church of St. John, Chilcompton, has been restored at a cost of about 1,600*l*. The work was carried out under the superintendence of Mr. F. Bligh Bond, of Bristol, by Mr. John Sperring, of Midsomer Norton.

CHURCH, STRATA FLORIDA, CARDIGANSHIRE.—A new church was opened recently at Pontrhydfendigaid, in the parish of Strata Florida. The building will accommodate 250 persons, and has cost about 1,500*l*. Mr. Telfer Smith, of Builth Wells, was the architect.

BAPTIST SUNDAY SCHOOLS, SHEFFIELD.—The foundation-stone was laid recently of new Sunday schools in connexion with Cemetery-road Baptist Church, Sheffield. The buildings were designed by Mr. J. Amory Teatner.

CATHOLIC CHURCH, ARDARA, IRELAND.—The foundation-stone of the Church of the Holy Family, Ardara, Strabane, was laid recently. Mr. E. J. Toye, of Derry, is the architect, and Mr. D. M'Caffrey, Strabane, is the builder.

WESLEYAN CHAPEL, CLIFTON, NEAR OTLEY, YORKSHIRE.—Foundation-stones have just been laid of a new Wesleyan chapel at Clifton, near Otley. Messrs. Fairbank & Wall, of Otley, are the architects.

PRIMITIVE METHODIST CHAPEL, HASLAND, DERBYSHIRE.—Foundation-stones of a new Primitive Methodist chapel for Hasland, near Chesterfield, were laid on the 15th inst. The new building is being erected on the Chesterfield-road, at the junction with the Grassmoor-road. It will cost, including the site, 2,600*l*., and will accommodate about 300 worshippers. It will be of red brick, with stone dressings. Mr. W. Cecil Jackson, of Chesterfield, is the architect.

ACADEMY, LINLITHGOW.—The Linlithgow School Board are about to erect an academy on a site to the south-east of Linlithgow Palace. The cost will be between 3,000*l*. and 4,000*l*. Mr. Fairley, of Edinburgh, is the architect.

BOARD SCHOOL, KIRKBY-IN-ASHFIELD, NOTTINGHAMSHIRE.—Mr. J. Carvell Williams, M.P., recently opened a block of schools which has been erected at Kirkby-in-Ashfield, at a cost of 4,720*l*., in Chapel-street. The new building, which, together with two

large playgrounds, covers a quarter of an acre of land (purchased from the Duke of Portland for 888*l.*), will afford accommodation for 420 children. The structure, which externally is of red brick faced with stone dressings, comprises a central hall, 55 ft. by 25 ft., and five classrooms, each 25 ft. square, in addition to several cloakrooms and a head-teacher's room. The internal fittings are of pitch-pine, and the classrooms are cut off from the main hall by folding partitions, the floors being paved with wood blocks. The building is heated by means of hot-water pipes, and Boyle's system of ventilation has been adopted. Mr. H. Gilbert, of East Kirkby, was the contractor, the architect being Mr. Lawrence Bright, of Nottingham.

THEATRE ROYAL, PORTSMOUTH. — The Theatre Royal, Portsmouth, was reopened on the 11th inst. after reconstruction. The building was closed about four months ago, and has since been practically rebuilt. A new stage, &c., has been erected on a piece of land at the back of the building, the space occupied by the old stage having been added to the auditorium. The entrances have been re-arranged and additional exits formed. An iron and glass shelter has been placed over the pavement in front of the principal entrances. The work was carried out by Mr. J. H. Corke, of Southsea, from designs by Mr. Frank Matcham.

NEW LUNATIC ASYLUM, NEAR ABERDEEN.—Mr. A. Marshall Mackenzie, architect, Aberdeen, has completed the plans of the new asylum (on the village system) to be erected by Aberdeen City Parish Council at Kingseat, New Machar. The model of the Alt Scherbitz Asylum in Prussian Saxony has been followed. The range of buildings will cover upwards of fifty acres. The hospital will provide for about 700 inmates, and stands in front of the administrative block, a recreation hall separating the two buildings. There will be observation wards for male and female patients, convalescent wards, and "closed villas," where patients will be kept under observation until fit to be transferred to the open villas and the working "colony." The administrative block, which is three stories in height, will contain (on ground floor) medical superintendent's room, boardroom, waiting-rooms, bathrooms, &c.; on first floor, bedrooms and smoking and billiard room for male attendants; and on second floor, bedroom accommodation. The quarters for female attendants and nurses will be to the west of the administrative block, and will be provided with an amusement hall, tennis court, and other means of recreation. The medical superintendent's residence, the gardener's house, and the steward's lodge will be built facing the public road, and the total cost of the scheme is estimated at from 80,000*l.* to 100,000*l.*

BOARDROOM, WALSALL WORKHOUSE. — The newly-erected boardroom and offices at Walsall Workhouse were opened recently by the Chairman of the Board. The new building has been erected on the land adjoining the workhouse, on the Pleck-road, and is of brick, with stone dressings, with an open space with palisading in front. On the ground floor, the chief room is the waiting-hall, of 40 ft. by 30 ft., and on the opposite side of the corridor are two committee-rooms, each of 20 ft. by 20 ft., with lavatory, &c. The upper story is approached by a stone staircase, and consists of the boardroom, 40 ft. by 30 ft., a room for the chairman, one for the clerk, ladies' and gentlemen's cloakrooms, waiting-room, &c. The building has been erected by Mr. W. Wistance, from the plans, selected in competition, of Mr. H. E. Lavender. The cost of the building has been 3,300*l.*

CO-OPERATIVE PREMISES, SELLY OAK, WORCESTERSHIRE. — The Stirchley Co-operative Society have erected five shops at the corner of Hulbert-road and Exeter-road, Selly Oak. The building is of red pressed bricks with buff terra-cotta dressings. The plans were prepared by Mr. R. W. Chadey, of Bournville, the Society's architect. Messrs. Cheese & Son, of Worcester and Birmingham, are the builders.

PUBLIC OFFICES, SETTLE, YORKSHIRE. — The Town Hall, which is in the Market-place, Settle, was recently purchased by the Settle Rural District Council, and converted into public offices for themselves and the Board of Guardians. The alterations cost about 1,100*l.*, and were planned by Mr. H. Ross, of Accrington, and carried out by the following contractors: — Masonry and furnishing, Messrs. Brassington Bros. & Corney; heating and plumbing, Mr. W. Hayton; joinery work, Messrs. Parker Bros.; and painting, Mr. E. Handby, all of Settle. The ventilating work was executed by Messrs. Hatton & Co., of Manchester.

NEW CHURCH HOUSE, WHITBY.—On the 14th inst. the new parochial hall and church house which has been erected for the parish of Whitby was opened. It contains a room for meetings, 66 ft. long by 33 ft. 6 in. wide, and is calculated to seat nearly 400 people, besides having a platform at the south end. It is approached direct from St. Hilda's-terrace, and the entrance is protected by a covered porch. Cloakrooms and ante-rooms are provided at the side of the building connected both with the hall and the platform, and there is also a kitchen. Under the platform end of the building is another story approached by staircases both from St. Hilda's-terrace and from Newton-street; it contains a classroom, 33 ft. 6 in. by 20 ft., and is divisible in the centre by a movable glazed partition, forming two separate rooms when needed for smaller classes; there is also a third classroom, 17 ft. 6 in. by 13 ft., and two cloakrooms. The whole building is of red brick and terra-cotta, and roofed with red tiles. The inside of the main hall is lined with glazed bricks to the height of 5 ft. all round, and the roof is of pitch-pine varnished. The classrooms have dados of glazed brick and floors of wood blocks. The heating is by hot water on the low-pressure system. The building has cost upwards of 1,500*l.*, and has been erected under the supervision of Mr. E. H. Smiles, A.R.I.B.A., of Whitby, the contractor being Mr. John Braim, of Whitby.

TOBACCO FACTORY, LIVERPOOL. — A tobacco factory has been erected off Bounday-lane, West Derby-road, Liverpool, for Messrs. Ogden's, Limited. The buildings and land have cost 81,000*l.* Mr. Henry Hartley, of Liverpool, was the architect, and Messrs. Kelly Brothers, of Walton, and Messrs. Joshua Henshaw & Sons, of Liverpool, were the contractors. Mr. John Kelly was the clerk of works.

HOTEL, UPPER HOLLOWAY. — The foundation-stone of the new Marlborough Hotel, Upper Holloway, was laid on the 14th inst. Mr. George Hubbard is the architect, and Mr. W. Nash, of New Cross, is the builder.

PUBLIC WASH-HOUSE, GLASGOW. — The new public wash-house in Bain-square, Glasgow, was opened on the 14th inst. The building was designed by Mr. M'Donald, the City Engineer, and has cost about 5,000*l.*

A NEW THEATRE IN SHAFTESBURY AVENUE — Plans and designs have been prepared by, we understand, Mr. L. Sharp for a new theatre to be built upon a site in Shaftesbury-avenue, abutting in the rear upon Archer-street, Soho.

RESIDENTIAL FLATS, KNIGHTSBRIDGE.—Mr. G. D. Martin is the architect of the block of residential flats, named Park-mansions, now being erected upon a site situated between the High-road, Knightsbridge, Brompton-road, and Knightsbridge-green.

BUILDING IN ABERDEEN.—The lull in the building trade, which has lasted a year, shows signs of being over, and prospects are now much brighter. A fair number of structures of varied nature are in course of construction in the city, and there are not a few large public buildings to be gone on with forthwith. In connexion with the extension of Aberdeen Joint Station, in addition to our previous remarks, it may be mentioned that the railway viaduct is being seriously examined with a view to its enlargement for the Deeside Railway. The station buildings themselves will depend on the settlement of this point. Contracts will at once be entered into for the erection of a new electricity station for Aberdeen Corporation at Dee Village-road, and of the new asylum at Kingseat, Newmachar, Mr. A. M. Mackenzie, architect; while Messrs. Brown & Watt, architects, Aberdeen, on behalf of Aberdeen City Parish Council, are busily preparing plans for new poorhouse at Oldmill to supersede the existing East and West Poorhouses. It is also expected that estimates for the new General Post Office, Dee-street and Crown-street, will be settled next month. The new Greyfriars Church (Mr. A. M. Mackenzie, architect), and several new Board schools will also be proceeded with in the near future.

TOWN HALL, LYNTON, DEVONSHIRE.—On the 15th inst. Sir George Newnes, Bart., handed over the title deeds of the Lynton Town Hall to the Chairman of the Urban District Council. The building was designed by Messrs. Reed & Macdonald, of London, and erected by Messrs. Jones Bros., of Lynton. The principal hall, which is on the first floor, is 75 ft. long by 35 ft. wide. The ground floor contains a room 30 ft. by 20 ft. for the use of the Urban District Council. The cost was about 20,000*l.*

ARTISANS' DWELLINGS, DUBLIN.—The Corporation of Dublin intend to erect a large number of artisans' dwellings in the Bride's-alley area to replace the wretched tenements which until lately honeycombed the district. At a meeting of the Corporation on the 13th inst. a report of the Artisans' Dwellings Committee was adopted, in which tenders were submitted for the erection of the first section of the proposed artisans' dwellings in the Bride's-alley area. The first section of the building scheme provides for the erection of nine blocks of four-storied dwellings, four facing Bride-street and five facing Nicholas-street. The total number of dwellings in this section is seventy-two, of which fifty-six are three-roomed tenements, and sixteen are two-roomed tenements. The plans and specifications were prepared by the City Architect, Mr. M'Carthy, and seven Dublin firms tendered for the contract. Each of the builders sent in two estimates—one for the use of artificial stone, and the other for the employment of Irish limestone—for the dwellings. The Committee decided to use Irish limestone, and recommended the Council to accept the lowest total tender, which was sent in by Mr. Thomas Mackey, and which amounted to 17,132*l.* 10*s.* 2*d.* This recommendation has been agreed to by the Corporation. The conditions of contract provide that those employed on these works shall be paid not less than the minimum standard rate of wages paid in Dublin, that only regular tradesmen shall be employed to do tradesmen's work, and that the hours and conditions of employment now recognised as proper shall be observed. On the Bull-alley area Lord Iveagh intends building a large number of artisans' dwellings, a concert-hall, a swimming bath and wash-house, and a large public lodging-house. On the space flanked by St. Patrick's Cathedral Lord Iveagh is laying out a public park.—*Irish Independent.*

UNDERGROUND CONVENIENCES, LEICESTER-SQUARE.—The underground conveniences which have for some time been in course of construction in Leicester-square were opened to the public on the 5th inst. The conveniences are situated under the whole of the pavement opposite to the Empire Music Hall, and are for both sexes. The men's portion is at the Cranbourne-street end of the square, the accommodation consisting of twenty-nine urinals, thirteen closets, and eleven lavatories. The urinals are of the circular-back type in white enamel porcelain, the jambs, back skirtings, and top divisions being of St. Ann's marble; the foot treads are of hard slate. The tanks for periodical flushing are of marble with bevelled plate-glass fronts. The closets are Finch's siphonic, provided with three-gallon galvanised water waste preventers, and mahogany lift-up seats. The lavatories have tops of marble and are fitted with hot and cold water valves. The women's section contains seven closets, three urinals, and six lavatories, the entrance being opposite to Leicester-street. The closets and lavatories are the same as in the men's department. A feature of this section is a dressing-room for ladies. The conveniences have a dado of marble about 5 ft. in height, the rest of the walls being of white glazed bricks. The men's and the women's sections are connected by speaking tubes, for the attendants' use. The work was executed by Messrs. B. Finch & Co., Ltd., of Lambeth, for the Strand Board of Works, under the supervision of Mr. A. Ventris, the Surveyor to the Board. The whole is lit by incandescent electric lamps. The entrances are not yet complete, as the railings are not erected. There is, however, a temporary wall of wood. The railings will be erected by Messrs. W. A. Baker & Co., of Newport, Mon. At the bottom of each stairway is a gate by the B. and S. Folding Gate Company.

SANITARY AND ENGINEERING NEWS.

WATER AND DRAINAGE SCHEMES, WRITTLE, ESSEX. — A Local Government Board inquiry was held by Colonel A. J. Hepper, at the Board school, Writtle, on the 15th inst., with reference to an application by the Chelmsford Rural District Council for sanction to borrow 4,750*l.* for works of water supply, and 3,600*l.* for works of sewerage and sewage disposal in the Writtle special drainage district. Evidence was given by Mr. Taylor, the Engineer.

WATER SUPPLY, LEEDS.—The question of the water supply of the city was considered by the Waterworks Committee of the Leeds Corporation on the 17th inst. A short time ago the Committee made inquiries and ascertained that there was great waste of water in the city, and an appeal was issued to the public with the object of checking the waste. The figures submitted on the 17th inst. to the Committee by the City and Waterworks Engineer (Mr. Hewson) showed that the consumption of water at present was 16¾ million gallons per day, as compared with 18 million gallons per day a fortnight ago. The Committee are still prosecuting their inquiries with regard to the prevention of the waste of water, and a sub-committee has been appointed to visit other towns where a new system for the detection of waste in the mains by means of meters is in operation, with the view of obtaining information to guide the Committee in arriving at a decision. In connexion with this subject, the Engineer reported that he was taking steps to ascertain the actual water consumption in one or two districts of the city with some 20,000 to 40,000 inhabitants. The recent heavy rainfall has added greatly to the amount of water in store in the reservoirs, which is now equal to a supply for the city for ninety-three days. At the corresponding period of last year the quantity in the reservoir was equal to sixty-two and a half days' supply. A contract for a new 30-in. main to be laid from Eccup, by way of Arthington and Lindley Wood, to Swinsty Reservoir was adopted. The cost will amount to nearly 100,000*l.* At present there are three mains which are capable of bringing 18 million gallons per day to Eccup Reservoir. When the new main has been completed the quantity of water flowing into Eccup Reservoir will be increased to 24 million gallons per day.

SEWERAGE, &C., WOBURN, BEDFORDSHIRE.—The Ampthill Rural District Council and the Newport Pagnell Rural District Council have selected Messrs. D. Balfour & Son, of London and Newcastle, to prepare a scheme of main sewerage and sewage disposal, and also water supply, for the rapidly-developing districts of Woburn Sands, Aspley Heath, and Aspley Guise, which are to be embraced in a special district for these purposes.

NEW FOG-SIGNAL, ABERDEEN.—The Northern Lighthouse Commissioners are to proceed at once with the erection, at a cost of 5,000*l.*, of a new fog-signal at Gridleness, Aberdeen, the building, &c., being designed by Mr. David Alan Stevenson, M.Inst.C.E., the Commissioners' Chief Engineer.

WATERWORKS, BURLEY.—The new scheme of the Burley District Council—sanctioned by Parliament last year—has advanced another step by the letting

of the work of constructing the Carr Bottom Reservoir on Burley Moor to Mr. Thomas Smith, of Bingley, at about 5 per cent. in excess of the estimate of the Engineer, Mr. Malcolm Paterson. The reservoir will be formed by an earthen dam about 367 yds. long, with curved ends, and will hold about 15,000,000 gals. It is expected to be completed in two years.

OSSETT SEWAGE DISPOSAL.—On the 21st inst. Colonel A. J. Hepper, R.E., held a Local Government Board inquiry at Ossett into the application of the Town Council for sanction to a loan of 8,500*l.* for the extension of their southern outfall sewage works at Healey. The works proposed will transform the existing works, which, when complete, will consist of a screening tank, precipitation tanks holding 200,000 gallons, buildings and machinery, sludge tanks, and about seven acres of land for filtration. There will also be 1,000 square yards of storm-water filtering area. The details of the scheme were explained by the Engineer, Mr. Malcolm Paterson, on behalf of himself and Mr. S. Shaw as joint engineers. This is the second scheme affecting this outfall now before the Local Government Board, the first being for a loan of 5,000*l.* for an intercepting sewer nearly three miles long, to bring into the above works the sewage of several outlying parts of the borough. The whole scheme will thus cost 13,500*l.*, but it should be explained that this amount includes the purchase money for 32 acres of land at 80*l.* per acre, the vendors having refused to sell a part only of their estate. The sewage contains a good deal of trade effluents, chiefly wool-washing and dye-water, with a little sulphuric acid.

FOREIGN.

FRANCE.—A new square is to be formed in the Eighteenth Arrondissement of Paris, at the Place Hébert.——The Paris Chamber of Commerce has voted a sum of 420,000 francs for the enlargement of the Ecole Supérieure de Commerce.——The Exhibition of Femmes Peintres et Sculpteurs will open on September 1, in the Orangery of the Tuileries.——The Château of Malmaison has now been entirely restored and put in order, but the Government are still hesitating about officially accepting it from the present proprietor, M. Osiris; and it is possible that he will end by presenting the house and its contents to the Municipality of Rueil. ——A new line of railway is to be opened in the Jura, from Morbier to Morez.——The Municipal Council of Avignon is considering the means of preserving the old Papal palace, which has for many years been in use as a barracks. A sufficient sum of money is to be voted for the construction of a new barracks, and for a restoration of the ancient building.——The death is announced, at the age of seventy-eight, of M. Henry Jean Baptiste Dubois, member of the Société Centrale des Architects. He was a pupil of Vaudoyer, and, after filling the office of Inspecteur des Travaux for the Nord Railway Company, he held a similar post under Visconti for the repair of the Tuileries in 1851-52. In 1864 he became architect to the "Compagnie Générale des Marchés" of Paris. He was also architect for a number of private houses, houses in flats, &c. His son, M. Henri Dubois, is also a member of the Société Centrale.——We have to announce also the decease of M. Antony Valabrègue, a well-known art-critic, who had been entrusted with a good many artistic missions by the Government, and had visited the art museums of England, Germany, Holland, and Belgium, in order to draw up a catalogue raisonnée of French works of art in foreign museums. He was also much concerned in establishing museums of industrial and applied art in France.

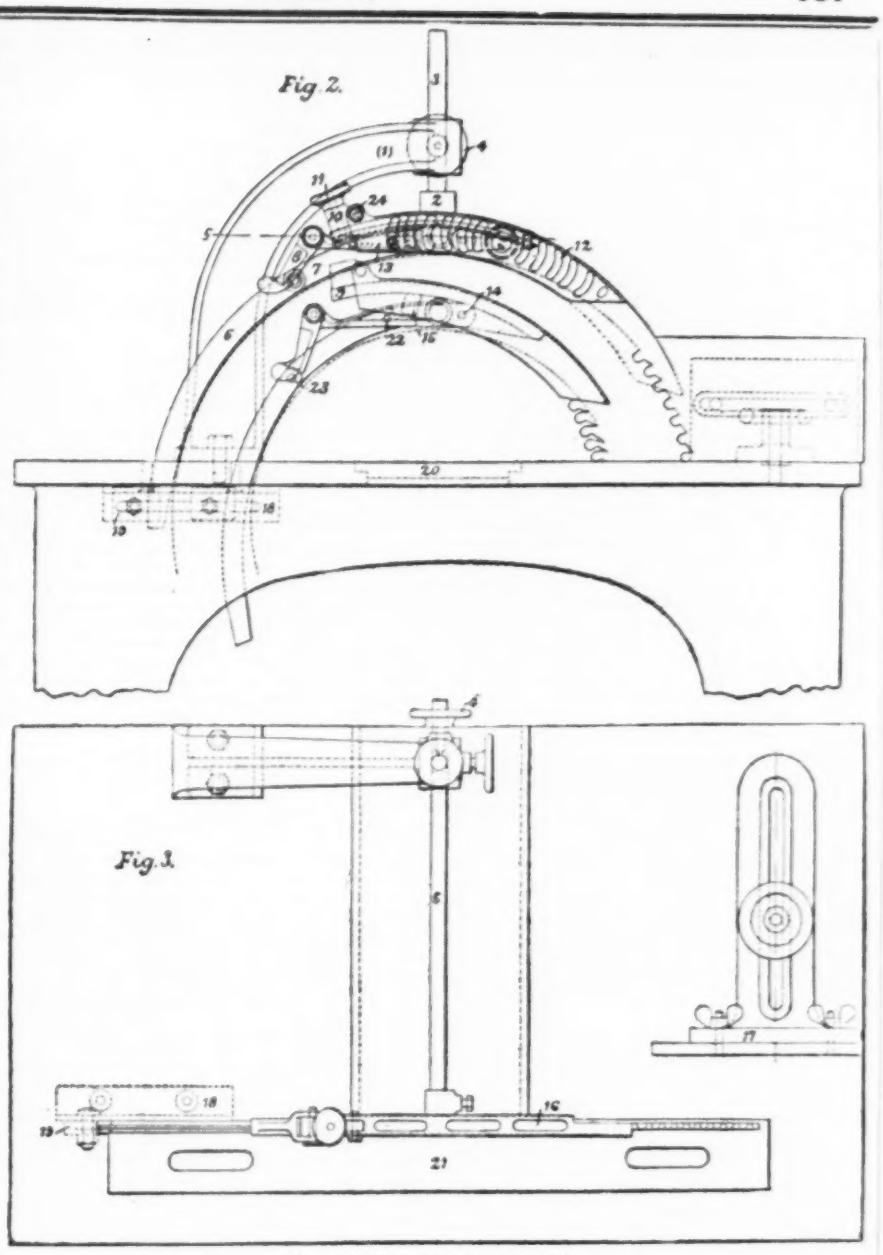
MISCELLANEOUS.

APPOINTMENT.—We are informed that Mr. P. E. Taylor, for seven years Architectural Assistant to the Hull Corporation, has been appointed Chief Architectural Assistant to the Corporation of Coventry.

DUST DESTRUCTOR AND ELECTRIC LIGHTING STATION, WHITECHAPEL.—The new dust destructor was opened and the foundation stone of the new electric lighting station was laid on the 2nd inst. The works are being carried out under the supervision of Mr. Jameson, the Engineer to the District Board of Works, in consultation with Mr. Knight, of Brighton. The destructor was built by Messrs. Manlove, Alliott, & Co., of Nottingham, and Mr. Wm. Griffith is building the electric lighting station.

ISLINGTON PROPRIETARY SCHOOL.—The premises in Barnsbury-street occupied until lately by the Islington Proprietary School are offered for sale. The old school buildings, since enlarged and heightened with an additional story, were built in or about the year 1820 after John Newman's plans and designs.

ST. PAUL'S CATHEDRAL.—Under the superintendence of Mr. Somers Clarke, architect to the Dean and Chapter, and Mr. Harding, clerk of the works to the cathedral, an inscription has been carved in a stone at the foot of the steps leading up to the western doors to commemorate the fact that upon that spot, on June 22, 1897, the Queen offered up thanks for the sixtieth anniversary of her accession.



Glover's Circular Saw Guard.

GLOVER'S CIRCULAR SAW GUARD.—To have a guard to a circular saw which shall afford adequate protection and at the same time interfere as little as possible with the working, is a matter of great importance in a steam joinery shop; and we therefore call attention to the drawing of a circular saw guard made by Messrs. M. Glover & Co., of Leeds, and called by them the "Ideal" guard. The advantages claimed for this are, among others, that it can be adjusted, with ease and with little loss of time, to smaller or larger saws, that it protects the sides of the saw-teeth as well as the tops, and that it protects the front of the saw as far down as the wood being sawn will allow. The following references to the figures on the diagram will afford the best explanation of its structure and action:—

References to Diagram:—

1. Bracket fixed on back or side of bench.
2. Universal carrying block, working on upright shaft, enabling guard to be quickly adjusted or swung aside in case of sharpening in the bench. No need to move the guard when changing saws.
3. Upright shaft or screw with means for fixing.
4. Small hand wheels for fixing after adjusting.
5. Horizontal shaft carrying the guard.
6. Curved and hinged steel "rear guard blade," held at one end under bench top by adjustable bracket and bolt.
7. Curved double-hinged steel "back guard blade."
8. Forked hinged tail piece, whereby the hinged blades are kept linable with saw and rigid side ways.
9. "Tilting holder" with long circular slide carrying the hood (12) in whatever position may be desired.
10. Curved block working in slide of "tilting holder" (9) to which "hood" (12) is hinged.
11. Small hand wheel for instantaneously fixing the block (10) with hood (12) in the required position.
12. Adjustable and hinged hood.
13. Shows one of the devices for instantaneously adjusting blade (7) to the curve of saw and for fixing same.
14. Centre upon which the "holder" (9) "tilts" when adjusted, so that the hood (12) operates suitably for the required curve of saw, whatever be the diameter.
15. Shews one of the devices for fixing the "tilting holder" (9) in the required position instantaneously, nuts or cotters being avoided.
16. Perforations in hood (12) which enable the sawyer to see the line of his saw.
17. Fence which may be brought up close for sawing thin boards, and with ground off saws.
18. Slotted bracket which fixes underneath the bench, and upon which works the cramping plate (19) and bolt, which holds the back knife (6) in line with the saw.
20. Loose leaf which is provided in many types of saw benches, but the brackets are fixed quite clear of this.
21. A loose leaf against the saw.
22. One of the centres upon which the back blade hinges. The main portion of the guard can be swung away from the saw whilst the back guard is left bolted in its position; thus there is no difficulty in sharpening a saw whilst in the bench, after which the main portions of the guard can be swung back again, and almost instantaneously connected with the back steel guard.
23. Refers to a level rule joint in the back blade, which enables the blade to fit more perfectly different diameters of saws.
24. Refers to a hinge upon which the sliding hood works when required.

ADVANCED INSTRUCTION FOR TEACHERS OF PLUMBING CLASSES.—With a view to creating an efficient body of teachers of plumbing classes throughout the country, advanced courses of instruction are carried on at King's College, London. A course is now in progress under the auspices of the Plumbers' Company and the Technical Instruction Committees for Lancashire, the West Riding of Yorkshire, and Great Yarmouth. Instruction is given in the branches of physics and chemistry underlying the practice of plumbing, as well as in sanitation and advanced practical plumbing. The classes are held daily for a month in the workshops and laboratories equipped by the Plumbers' Company. The Saturdays throughout the course are devoted to visiting important plumbing and sanitary works in and around London. By the courtesy of Messrs. Waterhouse & Son, architects, Messrs. Matthew Hall & Co., plumbers, and Mr. Thomas Holloway, builder, the students were enabled on Saturday last to pay visits to the extensive flats now being erected at Artillery Mansions, Westminster, and the extension to the University College Hospital.

TIMBER YARD FIRE, SHEFFIELD.—A fire broke out in the early morning of the 16th inst. at Messrs. Flowerday's Midland Saw Mills and Joinery Works, in Savile-street and Greystock-street, Sheffield. The whole of the premises, with the exception of the offices, was destroyed.

State of Labour in the Building Trades during July.—According to the *Labour Gazette*, employment in the building trades remained good during July. The percentage of unemployed union members among carpenters and plumbers at the end of the month was 1·8, compared with 2·0 in June and 1·1 per cent. in July of last year. Of the seven disputes which commenced during the month, six were in England and one in Scotland. Five of the disputes have been settled, no settlement being reported of the remaining two.

The Roman Wall of the City.—By a gradual and successful process the course of the old Roman wall, which formerly encircled the City, is being located. The suspicion that the Mediæval wall followed the course of the splendid line of fortification built by the Roman warriors has in more than one instance been proved to be a fact. By means of the excavations made very recently under the old wall at the back of the church of St. Giles, Cripplegate, additional evidence is afforded of the circumstance. The work has been carried out under the direction of the City Surveyor (Mr. A. Murray) and Mr. Deputy Baddeley, and under the personal superintendence of Mr. J. Terry, the clerk of the works. The old bastion was greatly in need of repair, and when the workmen made further excavations it was discovered that the whole of the Mediæval work had been built upon the Roman bastion. This result was obtained at a depth of just 6 ft., where the vastness of the foundation was soon made manifest, and its remarkable strength demonstrated. The skill of the Roman builder is everywhere in evidence, even to the building of a culvert beneath the wall. This hard red-brick construction was probably used for draining the ditch when the latter was full. The culvert is oval in shape, and is in a remarkably good state of preservation. Everything points to the fact that the Mediæval wall follows that of the ancient fortification, which did infinite credit to the Roman workman. It is a matter of historic record that in 1477 the civic authorities repaired the old Roman wall from Aldgate to Cripplegate; and, further, that the Goldsmiths' Company mended the wall from Cripplegate to Aldersgate at about the same time. There is much yet to be learnt concerning the trend of the wall of the Romans, and it is probable that we are on the eve of more than one important and interesting archæological discovery in connexion with the recent excavation.—*City Press.*

Proposed New Street, Bradford.—The quarterly meeting of the Bradford City Council was held on the 14th inst., when it was decided to advertise for an architect to act as head of the proposed new municipal Architectural department, at a salary of 400*l.* per annum.—The Street Improvement Committee recommended that application be made to Parliament for powers to schedule a quantity of property for street improvements, including the proposed new street from the Exchange Station to the Midland Station. Alderman Dobson said the passing of the resolution would not bind the Council to construct the street, but would enable the committee to procure information upon which they might base a scheme to be laid before the Council for acceptance or rejection. Alderman Jowett suggested that the whole matter should be withdrawn for one month, and Alderman Dobson agreed to this, although he urged that the scheme was important, and its ultimate adoption would probably result in a saving to, not an increase of, the rates. The minutes were passed, with the exception of the scheduling clases.

The Great Seal.—The new Great Seal, which will replace the seal that has been used during the last twenty-two years, has been made from the designs of Mr. De Saulles. The seal itself represents the Queen in state robes seated upon a throne, whose arms are supported by lions. At the Queens' feet is a cushion embroidered with the rose, thistle, and shamrock, laid upon a footstool. At her right hand stands St. George, in armour, holding a lance. On the panels are the sword and scales of Justice within wreaths of laurel; around is the legend, "Victoria Dei Gratia, Britt. Regina, Fid. Def. Ind. Imp." On the counter seal is the Queen crowned and holding the orb and sceptre, mounted on a palfrey. In the right field are the Royal arms, encircled with the Order and motto of the Garter. Above is a scroll bearing "Dieu et Mon Droit," and at the sides are the rose, thistle, and shamrock. In the distance, below, are the sea with an ironclad and a sailing ship, together with a trident, dolphins, and waves, emblematical of our country's naval strength and maritime commerce.

Institute of Sanitary Engineers (Incorporated).—At a meeting of the Election Committee held on the 15th inst. the following gentlemen were elected. Members: G. W. Allen, London; H. W. Gladwell, Walton-on-Naze; J. New, Italy; T. S. Venkateswariah, Madras. Associates: R. Blythe, Durham; M. J. H. Lawrence, Pontypridd; W. G. Truscott, Southend-on-Sea; H. Willard, Tunbridge Wells.

Hyde Park-place.—The sites of Nos. 18-24 (west block), having a frontage of 152 ft. to the Bayswater-road, and covering an area of about 8,720 ft. superficial, and of Nos. 12-17 (east block), having a frontage of 121 ft. to the main road, and covering an area of about 9,450 ft. superficial, are about to be let, upon terms of ninety-nine years, for the erection of mansions, or flats, or hotel. Mr. A. J. Bolton is appointed, we learn, as architect for the proposed scheme.

Windows, &c., Clonfert Cathedral.—Three stained-glass windows and a memorial brass have been erected in the chancel of Clonfert Cathedral. They are the gift of Dr. Kenny, of Treeton, Rotherham, Yorkshire. The windows are rich in colour and represent David, Solomon, and the Good Shepherd. They were made by Messrs. Watson, of Youghal. The brass is what is known as a "Latten" brass. It was made by Gawthorp, of London.—A lady has presented to the cathedral a brass font ewer.

CAPITAL AND LABOUR.

The Building Trades in Cork.—For some little time past the builders' labourers in Cork have been negotiating with their employers for an increase of wages. The lowest rate of pay is 16*s.* a week, and in certain instances some men receive 17*s.* and others 18*s.* The demand now is for a weekly advance of 2*s.*—a shilling a week increase on September 1 prox., and another shilling on March 1 next. The employers met recently and refused to grant this, but as a compromise agreed to give a shilling increase on the standard rate of wages in March next. This decision was subsequently communicated to the men, who, as far as can be learnt, have not announced their acceptance or rejection of these terms, but continue to work under the conditions hitherto existing.—*Cork Examiner.*

LEGAL.

DISPUTE AS TO ANCIENT LIGHTS.

The case of Limburg *v.* Daniels again came before Mr. Justice Farwell, sitting as Vacation Judge, on the 22nd inst., on the application of the plaintiff for an interim injunction to restrain the defendant from erecting a building so as to interfere with the plaintiff's ancient lights. The case was reported in the *Builder* last week.

Upon the case being called on, Mr. Alexander, Q.C., for the plaintiff, said that the defendant had given an assurance that he was not going any further with his building, and inasmuch as the plaintiff, by his notice of motion, was not asking for a mandatory injunction, it was useless for him to proceed with the motion for an interim injunction. In these circumstances he had arranged with Mr. Everitt, Q.C. (for the defendant), that the motion should stand till the trial, the costs to be made costs in the action. The action to be set down at once.

Order accordingly.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

8,336.—A Regulator for Gas Supply: *J. Jones and D. Jones.*—For checking the supply of gas to a burner the inventors put a plug or diaphragm in a screw socket within the pipe. The plug—made of metal or of wood—has a small bore along its axis, into which is placed a small tube; the gas cock may also be similarly bored, or one of its elbows may be drawn together.

8,341.—A Stop for French Windows, Louvre Blinds, &c.: *A. I. Gousalves.*—To the fixed framing is pivotted a lever that is loaded at one end in order that the other end may form a stop as it rises to an extent which is limited by means of a curved slot and a screw. As the window is opened in one direction it lowers the end of the lever and passes over it, the window being freed by pressure upon the stop; the lever can be pivotted on to the window instead of the frame, and when fixed beyond reach can be pulled down with a cord or wire.

8,378.—Door Catches: *H. H. Fassell.*—A flanged disc which is kept in its place with a ring that is screwed on to, and is recessed in, the door frame holds a flexible ball within a metal socket which is placed within a recess in the frame, and a counterpart is screwed on to, and is recessed in, the door; by another method a length of india-rubber or other tubing is laid over a metal pin inserted into a rectangular socket, a counterpart being also provided.

8,383.—Bolts for Doors: *J. Banks and J. H. Banks.*—For use with "Tower" bolts the inventors have devised a combined base-plate, guides, and staples, which is fashioned out of a soft sheet-steel blank having slots and screwholes. After it has been annealed the blank is shaped between a pair of dies, so that it may have a guide-way, stop, and staples; the stop is bent to one side when the bolt is to be inserted, and the latter may be turned down into one or other of the depressions in the customary manner.

8,407.—Shutters for Windows: *J. Beaulis.*—The vertical plates are hinged together so that they may be folded against the wall or into a case or locker. The hinge pins carry upon their upper ends rollers that run upon rails above, and upon their lower ends rollers that run within a guide-rail or channel sunk in the ground. The end plate is pivotted on to a pivotted upright, which is fastened with sliding bolts. When fully extended the shutter is secured by means of pivotted catches that engage with staples, or of a jointed sliding bolt attached along its whole width.

8,450.—Manholes for Drains: *F. T. Grant.*—In the cover's depending flange are cut openings that will register with chambers in the frame, which communicate with the shaft underneath the dirt-box. The openings are fitted with flap valves made so as to open only inwards.

8,498.—Regulation of Cage Lifts: *G. Rennerfelt.*—In order to prevent an excessive rate of speed when the motor acts as a generator, the armature in the circuit is polarised by a current which passes through in a direction always the same. In the armature circuit of the motor are the starting-resistance and the field magnet's coil; when, therefore, the current in the field magnet is reversed it causes the armature to rotate, whereupon, by means of a crank, a link, and a pivotted arm, the contacts become bridged over and the resistance is short-circuited. In order to prevent a too sudden increase of the cage's rate of velocity, the motor is arranged to drive a pulley which a spiral spring joins to a fly-wheel upon its shaft. Upon opposed faces of the fly-wheel and pulley are contacts in the circuit of an auxiliary electro-magnetical brake. The fly-wheel's inertia and the spring's strength are so adjusted that the two contacts shall engage when the pulley's acceleration becomes excessive, and the brake arrest the cage's motion. The electro-magnetical switch for the motor armature circuit is put in the field magnet's circuit so that the latter circuit becomes closed always first.

8,511.—Ventilation and Hollow Walls: *A. Simpson.*—The walls are constructed with chambers within them, carried to any length and in any direction, the apertures for the admission of air from without, and for the escape of vitiated air, having a collective area much smaller than that of the wall-chambers, say in the ratio of 1 to 6. In order that vitiated air may be carried away holes having an aggregate area equal to that of the air chambers are made in the walls, floors, roofs, or ceilings. Within the chambers can be placed an apparatus for cooling, warming, or moistening the air.

8,541.—A Water Waste-Preventer and Siphonical Discharge: *H. Klein.*—The cistern's inlet cock has a float which is made in the shape of a trough or bell, and is arranged over the outlet, to which a twin siphon is attached. Between the two siphons is a pipe up which the pull-chain is passed, and the pull-chain is secured at its end to the float, so that when the chain is pulled the float descends, whereupon the dispersal of water in the cistern induces a discharge of the siphon.

8,561.—Opening and Closing of Gates: *W. H. G. Greaves.*—The invention's object is to provide means for enabling a gate to be opened and closed by any one who is on horseback, or automatically by the weight of a vehicle; to the gate-post is pivotted a sector-shaped arm which carries an upper pivot or pivot-socket, and is also fitted with cords that pass through a guide-ring common to both. The gate can be opened or closed from either side by the pulling of one of the cords; for a fastener or latch a projection upon the gate is caused to engage between two pivotted and weighted jaws, whereof either one is pressed down by the projection when the gate is closed. When the gate is opened with one of the cords it becomes first raised so as to liberate the projection from the jaws, and when the gate has been again closed (by the pulling of the other cord) it becomes raised above an ordinary pivotted stop. The principle of the invention is adapted to other forms whereby the gate may be opened from only one side, or be opened and closed from both sides automatically, through a vehicle's weight, by means of a lever and arch contrivance.

8,638.—Couplings and Joints for Pipes: *R. Mark and W. Mark.*—To effect a disconnectible bayonet-joint or coupling projections upon each pipe fit into grooves inside the sleeve, and when the sleeve is turned round the pipes are moved inwards by the slope of the sides. Between the ends of the pipes is inserted a packing or a washer, and the joint is tightened with wedges that are forced into the grooves lengthwise; the coupling is described as being applicable for shafts.

8,642.—Pavement Lights: *R. Skene.*—The edges of the lights are bevelled so that they shall rise up in the frame as the latter contracts when it becomes cold; the light's refractive portion is shaped in the form of the base of an obtuse-angled triangle, whilst at intervals across its top are made parallel ridges whose cross-section is semi-circular.

8,645.—A Shed for Seasoning Timber: *F. Spaight & Sons and T. J. Ferguson.*—The shed is provided with arrangements for heating and for the supply of air. Perforated air-pipes are laid across

the shed's floor, their open ends passing through the outer wall; two steam pipes, fitted with drain cocks, and joined with a range of subsidiary inclined pipes, are set over the air-pipes, and above the pipes are tiers of joists, upon which the timber is laid. The steam-pipes heat the air that enters through the air-pipes, and which, having passed amongst the timber, escapes through the roof. Hot air or hot water may be employed instead of steam.

8,659.—A LOWERING APPARATUS: *F. O. Miller and D. Agnew.*—The contrivance, whilst devised chiefly for a fire-escape, is available for use by painters and other workmen and in wells and mining shafts. A set of pivotted toggle-links force friction rollers against the lowering rope, which winds around a drum upon the axis of the clutch from which the workman is suspended. Two escapement wheels at the opposite ends of the drum's axis form an additional device for regulating the descent, the revolution of the wheels being controlled with reciprocating sliding pieces joined by a cross-lever. There are teeth upon the sliding pieces which severally engage with the two escapement wheels in turn.

8,663.—EXTINCTION OF FIRE: *A. H. Van Riper and P. F. Guthrie.*—A water pipe is supplied with chemicals that can be replenished as may be necessary. The chemicals consisting, say, of ammonium chloride four parts, and sodium chloride one part, are put into an inner and perforated removable casing, into which water is admitted. When two containers are used the water enters into one of them at a time, upon the closing and opening respectively of two valves, so that the container which is not in action may be again filled. If only water is employed one of the valves may be opened, whilst that of the chemical-container is closed.

8,726.—ELECTRICAL SWITCHES: *A. Watson (trading as A. Watson & Co.).*—The switches are more especially adapted for connecting up the one or the other of a pair of lamps. In one form of the apparatus a contact which connects the terminal with another contact is carried by an oscillating block, which is either slotted or forked to take the tumbler handle's working end; in another form a turn-button is substituted for the handle, and an eccentrically-mounted block takes the place of the oscillating block. For single-pole switches one of the contacts, or a pair of contacts, is discarded, and for a two-way switch spring contacts that engage with terminals are mounted upon the block.

8,796.—PROCESS OF MOULDING BRICKS, BLOCKS, &c.: *G. Woolliscroft and H. Todd.*—The inventors contrive that a handle, a crank shaft, and a system of levers shall force the ends of the mould and the upper and lower plungers inwards for pressing the material. The mould-ends, sliding upon a table, are joined to cranks with rods and levers; slotted links join a horizontal sliding-rod to a crank upon the shaft, and the sliding-rod carries side-rollers that act upon inclined blocks which are joined to the plungers. As the rollers are moved from between the inclined blocks the top plunger is raised by means of weighted levers, whose ends are taken in slots cut in slide-rods, which join the top plunger's cross-head to one of the blocks.

MEETINGS.

SATURDAY, AUGUST 25.

Northern Architectural Association.—An Excursion Meeting. Members to assemble at the Co-operative New Warehouse, Quayside, Newcastle, at 3 p.m. Mr. D. H. Brims, the contractor, will meet the party, and show them over the works of this patent ferro-concrete building.

SATURDAY, SEPTEMBER 1.

Architectural Association.—Summer Visit to Colney Chapel Convent, near St. Albans, by permission of the architect, Mr. Leonard Stokes.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 1.—By MASON & SONS (at Boston).

Wrangle, Lincs.—Freehold farm, 128 a. 2 r. 32 p. £5,000

August 9.—By J. A. & W. THARP (at Broadstairs).

Broadstairs, Kent.—Swinburne-av., 36 plots of building land, f. 1,803

By WYATT & SON (at Chichester).

Chichester, Sussex.—110 to 114, Bognor-rd., f. 700

By Messrs. BALLS (at Sudbury).

Cavendish, &c., Suffolk.—The Brick Works and 28 a. 0 r. 34 p., f. 400

Hawkedon, Suffolk.—Swan's Hall Farm, 179 a. 0 r. 19 p., f. 900

By BUCKLAND & SONS.

Windsor, Berks.—Thames-st., Layton's Restaurant, f. 24,000

By FAREBROTHER, ELLIS, & Co.

Merton, Surrey.—Morden-rd., enclosure of building land, 2 a. 0 r. 16 p., f. 810

By FURBER, PRICE, & FURBER.

Islington.—Ball's Pond-pl., i.g.r. 36*l.*, u.t. 32 yrs., g.r. 20*l.* £180

Dulwich.—160, Rosendale-rd., f., e.r. 65*l.* 700

August 10.—By WYATT & SON (at Pulborough).

Pulborough, Sussex.—Fairview and Brook Lodge, f., r. 46*l.* 700

By R. IMESON & SON (at Bedale).

Carthorpe, Yorks.—Freehold farm, 120 a. 1 r. 21 p. 3,200

Three cottages and enclosures of land, 17 a. 1 r. 39 p., f. 765

August 11.—By WILLSON & PHILLIPS (at Burnham-on-Crouch).

Burnham-on-Crouch, Essex.—Green's Farm, 30 a., f. 2,250

Terrace-lane, eighteen cottages, f., r. 109*l.* 15*s.* 1,480

High-st., house and range of stabling, f., r. 40*l.* 1,125

Piece of garden ground, f. 500

By SWORDER & SONS (at Cambridge).

Ickleton, Cambs.—Abbey-st., Accommodation Farm, 129 a., f. and c. 2,200

August 13.—By VINTEN & SONS (at Ramsgate).

Northwood, Kent.—1, 2, and 3, Coromandel-cottages, f. 34

St. Peter's, Kent.—Vicarage-rd., Thaxted Cottage and three cottages adjoining, f. 400

Vicarage-st., Alfred and Rose Cottages, f. 265

Church-st., cottage and stabling, f. 400

Chilton, Kent.—Chilton-lane, Chilton Farm, 110 a., f. 5,650

Pegwell, Kent.—Pegwell-lane, five cottages, f. 800

Ash-next-Sandwich, Kent.—15 a. of marsh land, f. 500

August 14.—By J. W. COADE.

Battersea.—14, Dorothy-rd., u.t. 87 yrs., g.r. 7*l.* 10*s.*, e.r. 35*l.* 355

By DEBENHAM, TEWSON, & Co.

Hampstead.—69, Fellows-rd., u.t. 64 yrs., g.r. 2*l.* 800

Forest Gate.—Dames-rd., f.g.r. 7*l.*, reversion in 69 yrs. 160

By Messrs. FOSTER.

St. James'.—15, King-st., u.t. 44 yrs., g.r. 70*l.*, r. 300*l.* 3,500

By H. SPENCER & SONS (at Torksey).

Brampton, Lincs.—Enclosures of grass and arable land, 37 a. 3 r. 39 p., f. 1,367

By WILLIAM ROLFE (at Masons' Hall Tavern).

Guildford, Surrey.—High-st., the Angel Hotel, f., with goodwill 11,500

August 15.—By T. N. TURNER.

Hyde Park.—139, Edgware-rd., and 15, Burwood-mews, u.t. 20 yrs., g.r. 16*l.* 10*s.*, r. 135*l.* 1,100

By WYATT & SON (at Chichester).

West Ashling, Sussex.—Four cottages and 1 a., c., e.r. 32*l.* 10*s.* 610

August 16.—By PEARCE & SONS.

De Beauvoir Town.—84 and 86, Southgate-rd., u.t. 18½ yrs., g.r. 14*l.* 8*s.* 625

Hackney.—91, Lauriston-rd., u.t. 51½ yrs., g.r. 7*l.*, r. 48*l.* 420

By STIMSON & SONS.

Hornsey.—Frobisher-rd., f.g.r's 31*l.* 10*s.*, reversion in 89 yrs. 780

Putney.—Mexfield-rd., f.g.r. 6*l.* 6*s.*, reversion in 93 yrs. 160

Bethnal Green.—204, Cambridge-rd., f. 470

Battersea.—16 and 17, Bolingbroke-rd., f., r. 87*l.* 1,200

Stoke Newington.—128, Manor-rd., u.t. 74½ yrs., g.r. 11*l.*, r. 75*l.* 920

Highbury.—140, Drayton Park, u.t. 76¼ yrs., g.r. 6*l.* 10*s.*, r. 36*l.* 365

Clerkenwell.—41, Rosoman-st., and 50, Northampton-rd., u.t. 33½ yrs., g.r. 8*l.*, r. 45*l.* 280

Hounslow.—Bath-rd., Park Dene and 5 a. 2 r. 18 p., f., r. 80*l.* 3,500

Grosvenor-rd., plot of building land, f. 350

Wellington-rd. North, Grosvenor House, also shop with stabling, &c., u.t. 60½ yrs., g.r. 10*l.*, r. 56*l.* 650

Croydon.—9, Addiscombe-gr., u.t. 64 yrs., g.r. 4*l.*, r. 30*l.* 400

Brockley.—7, Malpas-rd., u.t. 52½ yrs., g.r. 2*l.* 10*s.*, r. 30*l.* 300

Tooting.—The Broadway, shop and premises, f., r. 40*l.* 720

Brixton.—34 and 36, Josephine-av., u.t. 65½ yrs., g.r. 18*l.*, r. 110*l.* 1,200

11, Pulross-rd., u.t. 64½ yrs., g.r. 4*l.* 10*s.*, r. 36*l.* 315

14, Trinity-sq., u.t. 27½ yrs., g.r. 3*l.* 12*s.* 6*d.*, r. 78*l.* 920

19, Raeburn-st., u.t. 73¾ yrs., g.r. 6*l.* 10*s.*, r. 36*l.* 395

19 and 24, Solon-st., u.t. 67½ yrs., g.r. 13*l.*, r. 66*l.* 720

27, Plato-rd., u.t. 67½ yrs., g.r. 6*l.* 10*s.*, r. 34*l.* 380

41, Stockwell-pk.-rd., u.t. 22 yrs., g.r. 20*l.* 10*s.* 460

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	s.	d.				
Hard Stocks	34	0	per thousand alongside, in river.			
Rough Stocks and Grizzles	30	0	,,	,,	,,	,,
Smooth Bright Facing Stocks..	58	0	,,	,,	,,	,,
Shippers	42	0	,,	,,	,,	,,
Flettons.....	29	6	,,	,,	at railway depôt.	
Red Wire Cuts ..	34	0	,,	,,	,,	,,
Best Fareham Red	71	6	,,	,,	,,	,,
Best Blue Pressed Staffordshire ..	87	0	,,	,,	,,	,,
Do., Bullnose	92	0	,,	,,	,,	,,
Best Stourbridge Fire Bricks	84	6	,,	,,	,,	,,
Best White Glazed Stretchers.....	260	0	,,	,,	,,	,,
Headers	240	0	,,	,,	,,	,,
Quoins and Bullnose	340	0	,,	,,	,,	,,
Double Headers..	320	0	,,	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers ..	240	0	,,	,,	,,	,,
Quoins and Bullnose	280	0	,,	,,	,,	,,
Double Headers..	280	0	per thousand at railway depôt.			
Seconds Quality White and Dipped Salt Glazed	40	0	per thousand less than best.			

	s.	d.	
Thames and Pit Sand	5	0	per yard, delivered.
Thames Ballast	6	9	,, ,,
Best Portland Cement	36	0	per ton ,,
Best Ground Blue Lias Lime..	23	6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12*s.* 6*d.* per yard, delivered.
Stourbridge Fire-clay in sacks, 32*s.* 6*d.* per ton at rly. dpt.

STONE.

		s.	d.		
Ancaster in blocks		2	0	per ft. cube, deld. rly. depôt	
Bath	,, ...	1	7	,,	,,
Beer	,, ...	1	6½	,,	,,
Grinshill	,, ...	1	10	,,	,,
Brown Portland in blocks		2	2	,,	,,
Darley Dale	,,	2	1½	,,	,,
Red Corsehill	,,	2	5	,,	,,
Red Mansfield	,,	2	4½	,,	,,
Hard York	,,	2	10	,,	,,
Hard York 6 in.	sawn both sides landings, to sizes (under 40 ft. sup.)	2	7	per ft. super. at rly. depôt.	
,, ,,	6 in. Rubbed Ditto..	2	10½	,,	,,
,, ,,	3 in. sawn both sides slabs (random sizes)	1	3	,,	,,
,, ,,	3 in. self-faced Ditto	0	9	,,	,,

SLATES.

in.	in.		£	s.	d.	
20×10	best blue Bangor..		11	5	0	per 1000 of 1200 at ry. dep.
,,	best seconds	,,	10	15	0	,, ,,
16× 8	best	,,	6	2	6	,, ,,
20×10	best blue Portmadoc		10	18	0	,, ,,
16× 8	,,	,,	6	0	0	,, ,,
20×10	best Eureka unfading green.....		11	2	6	,, ,,
16× 8	,,	,,	6	15	0	,, ,,
20×10	Permanent green and Sedan green		10	0	0	,, ,,
16× 8	,,	,,	5	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles..	41	6	per 1,000 at rly. depôt.
Hip and valley tiles....	3	7	per doz. ,, ,,
Best Broseley tiles	48	6	per 1,000 ,, ,,
Hip and valley tiles....	4	0	per doz. ,, ,,
Best Ruabon Red, brown or bridled Do. (Edwards)	57	6	per 1,000 ,, ,,
Do. ornamental Do.	60	0	,, ,,
Hip tiles.....	4	0	per doz. ,, ,,
Valley tiles.....	3	9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000 ,, ,,
Hip tiles	4	1	per doz. ,, ,,
Valley tiles.....	3	8	,, ,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15	10	0	16	10	0
Deals: best 3 by 9	14	10	0	15	10	0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12	10	0	13	10	0
Battens: best 2½ by 6 and 3 by 6 ..	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best		
Battens: seconds	0	10	0	,, ,,		

	At per load of 50 ft.					
Fir timber: Best middling Danzig or Memel (average specification)	4	5	0	4	10	0
Seconds	3	17	6	4	5	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Swedish balks.....	2	15	0	3	0	0
Pitch pine timber (35 ft. average)..	4	0	0	4	10	0

[*See also page 185.*

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Harbour Offices	Swansea Harbour Trustees	100*l.* and 50*l.*	Nov. 30

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Granite and Gravel	Barnet U.D.C.		Aug. 27
*Waiting Room	Shoreditch Vestry	Vestry Clerk, Town Hall, Old-street, E.C.	Aug. 28
Paving, &c., Short-street, Chickenley	Soothill Nether U.D.C.	J. H. Ward, Surveyor, Council Offices, Earlsheaton	do.
Cottage and Bakehouse, Mill Dam, Pontefract		C. Keyworth, Architect, Bank Chambers, Pontefract	do.
Sewers, &c., between Spotland Bridge & Shawclough	Rochdale Corporation	S. S. Platt, Civil Engineer, Town Hall, Rochdale	do.
Shops, Witton, near Birmingham	Messrs. Byng, Hirst, & Byng	T. W. Willard, Architect, Rugby	do.
Workmen's Dwellings, James-street	Devonport Town Council	Borough Surveyor, 30, Ker-street, Devonport	do.
Schools	Kirby (Essex) School Board	C. E. Butcher, Architect, Queen-street, Colchester	do.
Additions to Tram Car Sheds, New Ferry	Birkenhead Corporation	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	do.
Church, Waskerley Park, Blackhill		Rev. James Taylor, 10, West View, Blackhill	do.
Flagging, &c., Footpaths, Claremont-road	Salford Corporation	L. C. Evans, Town Hall, Salford	do.
Additions to Holme Hill School	Great Grimsby School Board	H. C. Scaping, Architect, Court Chambers, Grimsby	Aug. 29
Making Michaelson-road	Barrow-in-Furness Corporation	Borough Engineer, Town Hall, Barrow-in-Furness	do.
Sewers, &c., Low Friarside and Linty	Tanfield (Durham) U.D.C.	R. Heslop, Surveyor, Burnopfield	do.
Sewers, &c., Crumlin Cross Roads	South Dublin R.D.C.	T. Phelan, Board Room, James-street, Dublin	do.
Sewers, Abbey-road	Barrow-in-Furness Corporation	Borough Engineer, Town Hall, Barrow-in-Furness	do.
Hotel, Rhymney	Rhymney Brewery Company	T. Roderick, Architect, Aberdare	Aug. 30
Alterations to the Royal Arms Hotel, Rhymney	do.	do.	do.
Seven Cottages, St. Olaves, near Yarmouth		Morgan & Buckingham, Architects, 3, Bidwell-street, Norwich	do.
Alterations to Chapel, Lwyddffynnon, Wales		J. Lloyd, Chapel House, Lwyddffynnon	do.
Water Supply Works, Huntly	Aberdeen Commissioners	J. Barron, Civil Engineer, 1, Bon Accord-street, Aberdeen	do.
Additions to Premises, Howick-street, Alnwick	Mr. A. H. Henderson	W. R. Hindmarsh, Architect, Alnwick	do.
Five Houses, Bargoed	Rhymney (Wales) Brewery Co.	T. Roderick, Architect, Aberdare	do.
Public Baths, &c., Marsh-lane	Bootle (Lancs.) Corporation	T. Cox, Architect, 11, Dale-street, Liverpool	do.
Culvert, Walker Park	Walker (Northumberland) U.D.C.	T. M. Sturgess, 5, St. Nicholas-buildings, Newcastle-on-Tyne	do.
Tar Pavement (6,500 yards)	Leamington Corporation	W. de Normanville, Engineer, Town Hall, Leamington	do.
Drainage Works, Balcarres-street	Edinburgh Magistrates & Council	Burgh Engineer, Town Hall, Edinburgh	do.
Workmen's Houses, West Port	do.	T. Hunter, City Chambers, Edinburgh	Aug. 31
Cottages, Abbotsham	Rev. R. W. Sealey	R. T. Hookway & Son, Architects, 12, Bridgeland-street, Bideford	do.
Shop Front, &c., 40, Scotch-street	Carlisle Corporation	H. C. Marks, Civil Engineer, 36, Fisher-street, Carlisle	do.
Additions to the Western Schools	Tynemouth School Board	F. R. N. Haswell, Architect, Tyne-street, North Shields	do.
Reservoir, High Warren	Warrington Corporation	J. Deas, Civil Engineer, Bank House, Warrington	do.
Stabling, &c., Treninick Farm, Gorran, Cornwall	Mr. W. Knight	F. C. Jury, Architect, Tregonissey-road, St. Austell	Sept. 1
Additions to Schools, Fazeley	Tamworth School Board	J. W. Godderidge, Architect, 4, Bolebridge-street, Tamworth	do.
Reconstruction of Bridge, Hammond Beck, Donington	Holland (Lincs.) County Council	L. Starkie, Surveyor, Wellington House, Skirbeck	do.
Sewers, &c.	Carrickfergus (Ireland) U.D.C.	S. P. Close, Civil Engineer, 13, Donegall-square North, Belfast	do.
Sewerage Works	Alderley Edge (Manchester) U.D.C.	W. Spinks, Engineer, 23, Park-row, Leeds	do.
*Firemen's Dwellings	Bradford Corporation	Mawson & Hudson, Architects, The Exchange, Bradford	do.
Sewers, Whitchurch-road	Llandaff R.D.C.	W. Fraser, Civil Engineer, 35, St. Mary-street, Cardiff	Sept. 3
Sewerage Works	Lower Bebington (Cheshire) U.D.C.	Beloe & Priest, Civil Engineers, 13, Harrington-street, Liverpool	do.
Subway under Railway, Dolan	Llanelly U.D.C.	H. W. Spowart, Town Hall, Llanelly	do.
Tramcar Shed, Thornbury	Bradford Corporation	J. H. Cox, City Surveyor, Town Hall, Bradford	do.
Road Works, Alexandra and Victoria-streets	Stapleford R.D.C.	F. R. Hawley, Surveyor, 1, Stamford-street, Ilkeston	Sept. 4
Billiard Room, &c., Polapit Tamar, Launceston	Mr. R. C. Coode	R. P. Wheliock, Architect, 45, Finsbury-pavement, London, E.C.	do.
*Foundations, &c.	Bristol County Council	H. Williams, Architect, 24, Clare-street, Bristol	do.
*Slop Carts	Leyton U.D.C.	Surveyor, Town Hall, Leyton	do.
*Lodge	Southgate U.D.C.	Council Offices, Palmer's Green, N.	Sept. 5
Sewers, &c.	Leicester Corporation	E. G. Mawbey, Civil Engineer, Town Hall, Leicester	do.
Paving, &c., Hanson-street	Middleton (Lancs.) Corporation	W. Welburn, Borough Surveyor, Town Hall, Middleton	do.
Water Supply Works	Melton Mowbray U.D.C.	R. Jeeves, Surveyor, Nottingham-street, Melton Mowbray	do.
Flints, &c.	Clacton-on-Sea U.D.C.	A. R. Robinson, Surveyor, Town Hall, Clacton-on-Sea	do.
Making-up St. Andrew's-road	Clacton (Essex) U.D.C.	do.	do.
Laying C.I. Pipes (5,000 yards)	Newtown (Montgomery) U.D.C.	R. W. Davies, Surveyor, Newtown	do.
Street Works, Hamlet Court-road	Southend Corporation	A. Fidler, Civil Engineer, Borough Surveyor, Southend	Sept. 6
Street Works, Kilworth-avenue and George-road	do.	do.	do.
Sewerage and Water Supply Works, Heamoor	Madron (Cornwall) U.D.C.	F. Latham, Civil Engineer, Penzance	Sept. 7
*Coastguard Buildings at Cromer	Admiralty	See Advertisement	do.
Drainage Works	Roxetti (Harrow) Burial Board	Cowell & Shaw, Surveyors, 49, Finsbury-pavement, E.C.	Sept. 8
*Cast-iron Socket Pipes	Reigate R.D.C.	R. B. Grantham & Son, 23, Northumberland-avenue, W.C.	Sept. 10
*Sewage Works	do.	do.	do.
Engine House at Waterworks	Worcester Corporation	T. Caink, Civil Engineer, Guildhall, Worcester	Sept. 11
Asphalte Paving, &c.	Wallasey (Cheshire) U.D.C.	W. H. Travers, Engineer, Public Offices, Egremont	do.
*Sewering, Levelling, Paving, &c.	Bromley U.D.C.	Surveyor, Council Offices, Bromley, Kent	do.
*Sewerage Works	Greenwich Board of Works	Offices, 141, Greenwich-road, Greenwich	Sept. 12
*Improving the Sea Front at Minehead	Minehead U.D.C.	F. W. Roberts, Engineer, Taunton	Sept. 15
*Stables, &c.	Bermondsey Vestry	Vestry Clerk, Town Hall, Spa-road, Bermondsey, S.E.	Sept. 17
*Storage Reservoir, &c.	Tynemouth Corporation	See Advertisement	Sept. 18
*Schools, Pleasley Hill, near Mansfield	Mansfield School Board	Vallance & Westwick, Archts., White Hart Chmbrs., Mansfield	Oct. 1
*Engineering Work for Public Baths	Acton District Council	Council Offices, 242, High-street, Acton	Oct. 2
*School at Croyland-road	Edmonton School Board	See Advertisement	do.
*Boundary Walls	Stepney Guardians	Guardians' Offices, Barnes-street, Stepney, E.	No date
Sixty-six Cottages, Shotton Colliery, Durham	Horden Collieries, Limited	The Manager, Shotton Colliery, Castle Eden R.T.O.	do.
Two Villas, Lightcliffe, near Halifax		G. H. Elliott, Architect, Lightcliffe	do.
Slater's Work at Electricity Works	Keighley Corporation	J. M. Smyth, Borough Engineer, Bridge-street, Keighley	do.
Altering Houses into Shops, Cheltenham-rd., Bristol		T. J. Moss Flower, Civil Engineer, 28, Baldwin-street, Bristol	do.
Roads, Conisborough, Yorks.		J. White, Civil Engineer, Mexborough	do.
Street Works, Ballysillan, Ireland		M. Johnson, Lough View House, Lower Ballysillan	do.
Road Works	Calverley, near Leeds, U.D.C.	W. Walker, Surveyor, Council Offices, Calverley	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	St. Pancras Vestry	3*l.* 3*s.* per week	No date

Those marked with an asterisk (*) are advertised in this Number. **Competitions**, *p.* iv. **Contracts**, *pp.* iv. vi. viii. x. *&* xix. **Public Appointments**, *pp.* xvi. xvii. *&* xix.

PRICES CURRENT (*Continued*).

JOINERS' WOOD.

	At per standard. £ s. d.	£ s. d.
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	17 10 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	24 0 0	25 0 0
Do. 3 in. by 9 in.	21 0 0	22 0 0
Battens	16 0 0	17 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0	19 10 0
Do. 3 in. by 9 in.	16 10 0	17 10 0
Battens	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in.	14 10 0	15 10 0
Do. 3 in. by 9 in.	13 10 0	14 10 0
Battens	12 0 0	13 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 10 0	12 10 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
,, ,, ,, 3 in. by 9 in.	12 10 0	13 10 0
,, ,, battens	10 10 0	11 10 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	29 0 0	31 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 0
Dantzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,,	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 6	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 7 6	- - -
Compound Girders ,, ,,	13 10 0	- - -
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	12 0 0	- - -

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON,—		
Common Bars	10 5 0	10 15 0
Staffordshire Crown Bars, good merchant quality	11 5 0	11 15 0
Staffordshire "Marked Bars"	13 5 0	- - -
Hoop Iron, basis price	11 5 0	11 15 0
,, ,, galvanised	17 0 0*	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 10 0	- - -
,, ,, to 24 g.	12 15 0	- - -
,, ,, to 26 g.	13 15 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. by 3 ft. to 20 g.	14 15 0	- - -
,, ,, 22 g. and 24 g.	15 5 0	- - -
,, ,, 26 g.	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 10 0	- - -
,, ,, 22 g. and 24 g.	19 0 0	- - -
,, ,, 26 g.	20 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft 20 g.	14 0 0	14 15 0
,, ,, 20 g. and 24 g.	14 15 0	15 10 0
Cut nails, 3 in. to 6 in.	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -
Pipe in coils	20 17 6	- - -
ZINC—Sheet—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -
COPPER—		
Strong per lb.	0 1 0	- - -
Thin ,,	0 1 2	- - -
Copper nails ,,	0 1 3	- - -
TIN—English Ingots ,,	0 1 7	- - -
SOLDER—Plumbers' ,,	0 0 8	- - -
Tinmen's ,,	0 0 10	- - -
Blowpipe ,,	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	2¾d. ,, ,,
,, ,, fourths	3¼d. ,, ,,
26 oz. thirds	3d. ,, ,,
,, ,, fourths	4¼d. ,, ,,
32 oz. thirds	4d. ,, ,,
,, ,, fourths	5¼d. ,, ,,
Fluted sheet, 15 oz.	3½d. ,, ,,
,, ,, 21 ,,	4¼d. ,, ,,
½ Hartley's Rolled Plate	3d. ,, ,,
¼ ,, ,, ,,	3½d. ,, ,,
	4¼. ,, ,,

PRICES CURRENT (*Continued*).

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
,, ,, ,, in barrels ,,	0 3 2
,, ,, ,, in drums ,,	0 3 4
Boiled ,, ,, in pipes ,,	0 3 4
,, ,, ,, in barrels ,,	0 3 5
,, ,, ,, in drums ,,	0 3 7
Turpentine, in barrels ,,	0 2 11
,, in drums ,,	0 3 2
Genuine Ground English White Lead per ton	27 10 0
Red Lead, Dry ,,	25 0 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 6
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

C. C. H.—A. H. (Amounts should have been stated). J. P. E. (Below our limit.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

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Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

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Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

AUCHTERLESS, N.B.—For additions to farm steading, Kingsford. Messrs. J. Duncan & Son, architects, Turriff:—

Masonry.—Pratt & Sons, Fyvil* £95 15
Carpentry.—W. H. Skene, Turriff* 135 0
Slating.—S. Christie, Jnr., Dyce* 72 15
} £303 10

BARKING (Essex).—For making-up, kerbing, &c., Creeksmouth-lane, for the Urban District Council. Mr. C. F. Dawson, surveyor, Public Offices, Barking:—

W. Griffiths £2,998 | D. T. Jackson, Barking* £2,400
J. Burrill 2,700
[Surveyor's estimate, £2,500.]

BEDFORD.—For making-up Dunville, Gratton, and Preston roads, for the Urban Sanitary Authority:—

Preston-road.

Rootham & Jeakings £63 5 3
A. Henman, Bedford* 62 5 6

Dunville and Gratton-roads.

Rootham & Jeakings £151 16 6
A Henman, Bedford* 149 8 0

BRIGHTON.—For the execution of wood-paving works for the Corporation. Mr. F. J. C. May, C.E., Town Hall, Brighton:—

A. & F. Manuelle £13,707 | P. Smith £13,140
W. Griffiths 13,584 | Mowlem & Co., Westminster* 13,034
Acme Wood Flooring Company 13,336

BURTON-UPON-TRENT.—For the erection of fifty cottages for the Corporation. Mr. G. T. Lynam, Borough Surveyor, Town Hall, Burton-upon-Trent:—

A. Jewell £12,133 19 2 | R. Kershaw £9,750 0 0
J. Dickenson 11,411 11 6 | J. & T. W. Selby 9,395 14 4
W. A. Stevenson 10,000 0 0 | W. Walkerdine, Derby* 9,000 0 0
G. Hodges 9,875 0 0
A. Geary 9,751 0 0

CANTERBURY.—For the execution of water-supply works, for the Blean Rural District Council. Mr. H. T. Sidwell, C.E., Herne-street, near Canterbury. Quantities by the Engineer for the Works:—

For supplying and laying:—
Williams, 71, Bankside* £1,446 0 0
Laying only—
Turner 918 0 0
Seamark & Hudson 727 0 0
E. Nun 595 0 0

Per ton:—

C. P. Gibbons £8 12 0 | Cochrane & Co. £7 15 0
Stanton Iron Works 8 7 6 | Butley Iron Works 7 12 6
J. Romans 8 2 0 | Sheepbridge Co. 7 12 6
S. Roberts 7 15 0 | Biggs, Wall, & Co. 7 9 6
| Merton 7 7 0

[Engineer's estimated cost, £1,500.]

CARDIFF.—For the erection of a house and depot, Roath Park, for the Corporation. Mr. W. Harpur, C.E., Town Hall, Cardiff. Quantities by the engineer:—

Gerard Hallett £2,149 8 10 | D. W. Davies £1,896 0 0
John Blight 2,041 9 1 | Geo. Griffiths 1,855 8 0
Melhuish Bros. 2,035 12 3 | E. R. Evans Bros. 1,850 8 2
W. H. Ingleson 1,998 10 0 | J. H. Venning* 1,850 0 0
Blacker Bros. 1,939 11 2
[All of Cardiff.]

COTTESMORE (Rutland).—For groom's cottage, with outbuildings, loose boxes, coach-house, and laundry, for Mr. G. Cecil Noel. Messrs. Tait & Herbert, architects, Friar-lane, Leicester:—

Emerson & Co., Cottesmore* £1,582 19 2

COVENTRY.—For the erection of foundations for an engine-house, Hales-street, for the Corporation. Mr. J. E. Swindlehurst, City Engineer, St. Mary's Hall, Coventry:—

Isaac & Sons, Foulshill* £1,019 13

CROYDON.—For making-up Marian-road, Mitcham, for the Rural District Council:—

Free & Sons £652 10 | E. Iles, Mitcham* £636 0

ESH (Durham).—For the construction of sewage disposal works for the Lanchester Rural District Council. Mr. J. E. Parker, C.E., Post-office Chambers, Newcastle-on-Tyne:—

E. H. Bell, Bishop Auckland* £898 9
[Engineer's estimate, £915.]

GRAVESEND.—For making-up, &c., Lennox-road for the trustees of the late Mr. J. Willoughby-Brown. Mr. G. W. Cobham, surveyor, 1, Edwin-street, Gravesend:—

J. C. Trueman‡ £250 0 0 | Masters & Co., Gravesend‡* £207 0 0
Thos. Adams§ 249 0 0
F. J. Field‡ 221 7 9
‡ Including fence. § Not including fence.

HALIFAX.—For the erection of a house, West Vale, for Mr. Chas. Greenwood, West Vale, near Halifax. Mr. F. F. Beaumont, architect, Southgate-chambers, Halifax:—

Masonry.—Drinkwater & Schofield, Greetland* £204 15
Joinery.—James Garside, West Vale* 62 0
Slating.—Hill & Co., West Vale* 42 0
Plumbing.—J. Sykes, West Vale* 30 0

HERNE (near Herne Bay).—For additions to hospital, west end (complete new block of four beds in two wards, convalescent ward, nurses' duty and day-rooms, &c.), for the Blean Rural District Council. Mr. H. T. Sidwell, C.E., Council Offices, Herne-street, near Herne Bay, Kent:—

Gain & Co. £1,930 | Smellie £943
Thos. Turner 1,283 | F. J. Gates, Herne Bay* 761
E. Adams 1,210 | [Surveyor's estimate, £778.]
Spencer Bros. 1,135

KEIGHLEY.—For the erection of a rectory house, for the Rev. H. J. Palmer. Messrs. J. B. Bailey & Son, architects, 3, Scott-street, Keighley:—

Greenhow & Murgatroyd, Keighley* £2,733 17
[All trades.]

KENDAL.—For the erection of a villa at Kendal, for Mrs. Bryce. Mr. John Hutton, architect, Kendal. Quantities by architect:—

Masonry and Slating.—J. Howie, Kendal*
Carpentry and Joinery.—T. & S. Park, Kendal*
Plastering.—Woodburn & Storey, Kendal*
Plumbing, Painting, and Glazing.—L. Airey, Kendal*
} £880

KING'S NORTON.—For the execution of private street improvement works, for the Urban District Council. Mr. A. W. Cross, C.E., 23, Valentine-road, King's Heath:—

Jacob Biggs £719 14 8 | Abel Cooper £467 14 6
Lowe & Sons 573 0 0 | R. W. Fitzmaurice, Birmingham* 457 7 2
Carrall, Lewis, & Martin 488 2 4

KIRBY MUXLOE.—For additional schoolroom accommodation at the Nonconformist Church. Messrs. Tait & Herbert, architects, Friar-lane, Leicester:—

Mason & Sharpe, Leicester* £187 15

LONDON.—For the erection of two houses and shops, Nos. 412 and 416, High-road, Tottenham, for Mr. Andrew Powles. Mr. Augustine C. Green, architect, 40, Bruce Castle-road, Tottenham, N.:—

H. Knight & Son £2,650 | W. H. Howell £1,830
A. Porter 1,972 | S. Goodall 1,597
J. Stewart 1,927 | John Groves* 1,474

[*See also next page.*

LOUGHBOROUGH.—For painting and decorating interior of Corn Exchange, entrance hall and staircase, and exterior of Town Hall. Mr. A. H. Walker, A.M.Inst.C.E., Borough Surveyor. Quantities by Surveyor :—

	Exterior of Hall.	Entrance Hall and Staircase.	Interior of Corn Exchange.	Total.
W. Bass	£23 0 0	£67 10 0	£132 15 0	£225 5 0
A. E. Walker	25 0 0	66 19 6	131 0 0	222 19 6
W. J. Billson	24 18 6	67 5 0	127 16 6	220 0 0
J. Fisher	26 15 0	56 17 6	134 0 0	227 12 6
F. Shipley	23 15 0	67 5 0	132 12 0	223 12 0
Grundy & Son	30 0 0	64 0 0	133 0 0	227 0 0
A. Street	27 10 0	68 4 6	135 15 0	231 9 6
T. Johnson	23 19 6	67 10 0	131 17 3	223 6 9
W. J. Shipley	23 9 0	70 0 0	134 5 0	227 14 0
Whitlock & Gatton	12 12 2	36 1 2	89 13 7	138 6 11
Smith & Co.	13 4 7	56 10 7	102 0 0	171 15 2
Walker & Son*	9 17 6	43 17 6	83 8 4	137 3 4
Sparrow & Son	12 2 4	49 16 4	84 19 4	146 18 1

LONDON.—For the erection of a stable and store, Page Green-road, South Tottenham, for Messrs. George Hickling & Co. Mr. Augustine C. Green, architect, 40, Bruce Castle-road, Tottenham, N. :—

J. Edgar	£385	J. Stewart	£265
Knight & Son	314	W. Easun*	235
C. H. Coll	284		

LONDON.—For proposed new depot for the London Parcels Delivery Company, Limited, at South End-road, Hampstead, N.W. Mr. Henry Poston, architect, 39, Lombard-street, E.C.:—

Holliday & Greenwood	£7,149	Hall, Beddall, & Co.	£6,819
Killby & Gayford	6,936	Todd & Co.	6,817
Mowlem & Co.	6,850	Blyton & Sons*	6,700

LONDON.—For sundry repairs at 12, Penywern-road, Earl's Court, South Kensington. Messrs. Morley & Letts, surveyors, 185, Earl's Court-road, S.W. :—

Heath & Son	£345	Smith & Son	£331
J. Whitaker	339	Holdstock & Mould*	325

LONDONDERRY.—For the erection of a shop and house, Barry-street and Strand-road, for Mr. W. M'Carter. Mr. T. Johnston, architect, 11, East Wall, Londonderry :—

McDaid Bros.	£525	Joseph Shannon	£405
J. Mooney	517	Alexander Dunlop	405
Maultsaid & Polloch	490	Shannon & Rutledge, Fountain-street*	400
Matthew Jack	427		
Crooks & Ferguson	424		

LOUGHBOROUGH (Leicestershire).—For alterations, &c., to Town Hall, for the Town Council. Mr. A. H. Walker, C.E., Town Offices, Loughborough. Quantities by engineer :—

H. Shardlow	£3,730	W. Corah	£3,466
J. G. Parker	3,627	Moss & Sons, Ltd., Loughborough†	3,450
J. F. Ball	3,620	Main, Kendall & Main	3,395
W. F. Harding	3,606	Wm. Tailby†	3,304
J. G. Sills	3,540		
C. A. Dobson	3,475		

† Withdrawn.

MORLEY.—For additions to bakery, Bakery-street, for Messrs. Metcalfe & Bradshaw. Messrs. Buttery & Birds, architects, Queen-street, Morley :—

Masonry.—W. & H. Sykes, Westfield-road, Morley	£186 12 10
Joinery.—J. Broscombe, Adwalton	157 13 0
Plumbing.—G. A. Firth, Fountain-street, Morley	28 0 0
Plastering.—E. Wilson, Westfield-road, Morley	30 0 0
Slating.—J. May, Peel-street, Morley	26 5 6

POKESDOWN.—For kerbing, paving, &c., Parkwood-road and two others, for the Urban District Council. Mr. E. W. Ingamells, engineer, Council Offices, Pokesdown, Hants :—

The Asphaltic Limestone Concrete Company, Limited	£2,259 16 5
W. H. Saunders	1,882 9 1
Josiah Smart	1,799 4 1
Grounds & Newton, Bournemouth and London*	1,752 2 7
H. Shepperd (informal)	—

PULHAM MARKET.—For the erection of a laundry at Workhouse, for the Depwade Guardians. Mr. A. Clarke, architect, 126, London-road, Lowestoft :—
Anthony Boddy, Orchard-street, Norwich* .. £499

ST. ALBANS.—For the erection of a detached residence, Manor-road, St. Albans, for Mr. A. E. Hancock. Mr. S. Doddimeade Edmunds, architect, 23, Victoria-street, St. Albans, and London :—

Miskin & Sons	£1,450	J. T. Bushell	£1,080
Goodchild & Sons	1,450	E. Dunham*	1,055
Boff Bros.	1,092		

(All of St. Albans.)

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WESTCLIFF-ON-SEA. — For the erection of a detached house, Imperial-avenue, for Mr. R. Chadwick. Messrs. Greenhalgh and Brockbank, architects, Bank Chambers, Southend-on-Sea, and Broad-street House, New Broad-street, London. Quantities by architects :—

Kirk & Kirk	£2,150	Dupont & Co.	£1,865
F. & E. Davey	1,956	Shelbourne & Co.	1,850
E. West	1,945	T. C. Galliard, Charing Cross, W.C.*	1,788
Davis & Leaney	1,935		

WESTCLIFF-ON-SEA.—For the completion of small residence in Preston-road, Westcliff-on-Sea, for Mr. J. Luke-Cocks. Mr. H. Fuller Clark, architect, 28, John-street, Bedford-row, W.C.:—
T. Lawford* £695

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